- Specification

Air Conditioner

Item		Specification
Compressor	Type	7VSX18 (External Variable Displacement Swash Plate)
	Oil type & Capacity	PAG 180 ± 10cc (6.3 ± 0.3oz.)
	Pulley type	6PK-TYPE
	Displacement	180cc/rev
Condenser	Heat rejection	13.850 - 5% kcal/h
Expansion valve	Type	Block type
Refrigerant	Type	R-134a
	Capacity	900 ± 25g (31.1 ± 0.88oz)

Blower Unit

Item		Specification
Fresh and recirculation	Operating method	Actuator
Blower	Type	Sirocco
	Speed step	Auto + 8 speed (Automatic), 1 - 4 speed (Manual)
	Speed control	Power mosfet (Automatic), Resistor (Manual)
Air filter	Type	Particle filter / Combi filter

Heater and Evaporator Unit

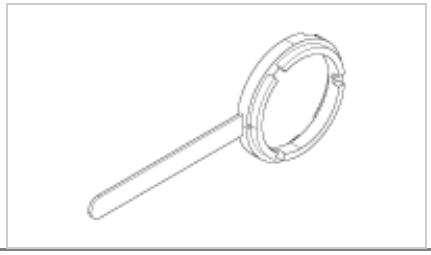
Item		Specification
Heater	Type	Pin & Tube type
	Heating capacity	5.100 - 5% kcal/h
	Mode operating method	Actuator
	Temperature operating method	Actuator
Evaporator	Temperature control type	Evaporator temperature sensor
	A/C ON/OFF	ON : 2.1°C (35.8°F)
		OFF : 0.6°C (33.1°F)

- Tightening Torques

Items		N.m	kgf.m	lb-ft
Compressor	Mounting bolts	19.6 - 23.5	2.0 - 2.4	14.5 - 17.4
	Limiter mounting bolts	5.0 - 7.0	0.5 - 0.7	3.7 - 5.1
	Clutch bolts	9.8 - 14.7	1.0 - 1.5	7.2 - 10.8
Compressor - Discharge hose		20.9 - 31.2	2.1 - 3.2	15.4 - 23.0
Compressor - Suction pipe				
Condenser - Discharge hose		19.6 - 23.5	2.0 - 2.4	14.5 - 17.4
Condenser - Liquid hose				
Tube & Hose assembly - Body mounting bolts		7.8 - 11.8	0.8 - 1.2	5.8 - 8.7

Tube & Hose assembly - Body mounting nuts TXV - Heater & Blower unit mounting bolts TXV - Cover mounting nuts	8.8 - 12.7	0.9 - 1.3	6.5 - 9.4

- Special Tools

Tool (Number and name)	Illustration	Use
09977-3R000 Clutch bolt remover		Removal and installation of clutch bolt

- Troubleshooting

Problem Symptoms Table

Before replacing or repairing air conditioning components, first determine if the malfunction is due to the refrigerant charge, air flow or compressor.

Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in order. If necessary, replace these parts.

After correcting the malfunction, check the complete system to ensure that performance is satisfactory.

Standard:

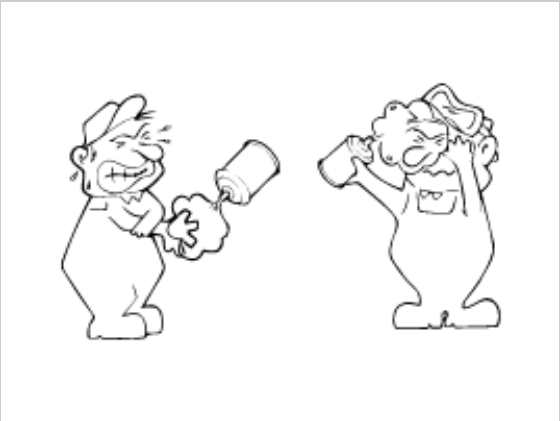
Symptom	Suspected Area
No blower operation	1. Blower fuse
	2. Blower relay
	3. Blower motor
	4. Power mosfet
	5. Blower speed control switch
	6. Wire harness
No air temperature control	1. Engine coolant capacity
	2. Heater control assembly
No compressor operation	1. Refrigerant capacity
	2. A/C fuse
	3. Clutch limiter
	4. Compressor
	5. A/C pressure transducer
	6. A/C switch
	7. Evaporator temperature sensor
	8. Wire harness
Vented air not cold	1. Refrigerant capacity
	2. Refrigerant pressure
	3. Drive belt
	4. Clutch limiter

	5. Compressor
	6. A/C pressure transducer
	7. Evaporator temperature sensor
	8. A/C switch
	9. Heater control assembly
	10. Wire harness
Insufficient cooling	1. Refrigerant capacity
	2. Drive belt
	3. Clutch limiter
	4. Compressor
	5. Condenser
	6. Expansion valve
	7. Evaporator
	8. Refrigerant lines
	9. A/C pressure transducer
	10. Heater control assembly
No engine idle-up when A/C switch ON	1. Engine ECM
	2. Wire harness
No air inlet control	1. Heater control assembly
No mode control	1. Heater control assembly
	2. Mode actuator
No cooling fan operation	1. Cooling fan fuse
	2. Fan motor
	3. Engine ECM
	4. Wire harness

- Instructions

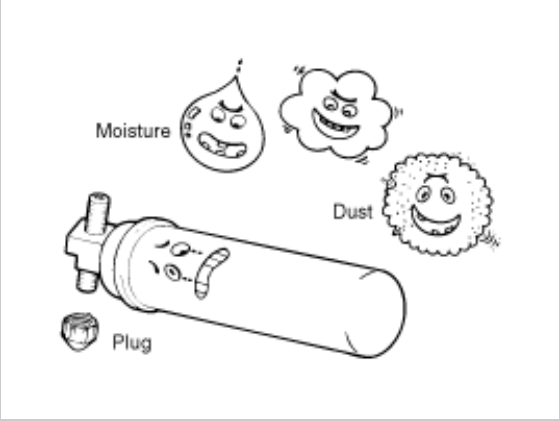
When Handling Refrigerant

1. R-1234yf liquid refrigerant is highly volatile. A drop on the skin of your hand could result in localized frostbite. When handling the refrigerant, be sure to wear gloves.
2. It is standard practice to wear goggles or glasses to protect your eyes, and gloves to protect your hands. If refrigerant splashes into your eyes, wash them with clean water immediately.
3. The R-1234yf container is highly pressurized. Never leave it in a hot place, and check if storage temperature is below 52°C (126°F)
4. An electronic leak detector should be used to check the system for refrigerant leakage. Bear in mind that the R-1234yf, upon coming into contact with flame, produces phosgene, a highly toxic gas.
5. Use only recommended lubricant for R-1234yf systems. If lubricants other than the recommended one used, system failure may occur.
6. PAG lubricant absorbs moisture from the atmosphere at a rapid rate, therefore the following precautions must be observed:
   – When removing refrigerant components from a vehicle, cap the components immediately to prevent entry of moisture.
   – When installing refrigerant components to a vehicle, do not remove the cap until just before connecting the components.
   – Complete the connection of all refrigerant tubes and hoses without delay to prevent the A/C system from taking on moisture.
   – Use the recommended lubricant from a sealed container only.
7. If an accidental discharge in the system occurs, ventilate the work area before resume of service.



When Replacing Parts on A/C System

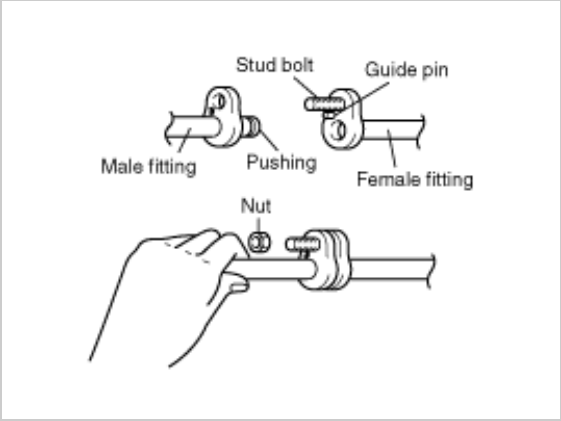
1. Never open or loosen a connection before discharging the system.
2. Seal the open fittings of components with a cap or plug immediately to prevent intrusion of moisture or dust.
3. Do not remove the sealing caps from a replacement component until it is ready to be installed.
4. Before connecting an open fitting, always install a new sealing ring. Coat the fitting and seal with refrigerant oil before making the connection.



When Installing Connecting Parts

Flange With Guide Pin

Check the new O-ring for damage (use only the specified) and lubricate by using compressor oil. Tighten the nut to the specified torque.



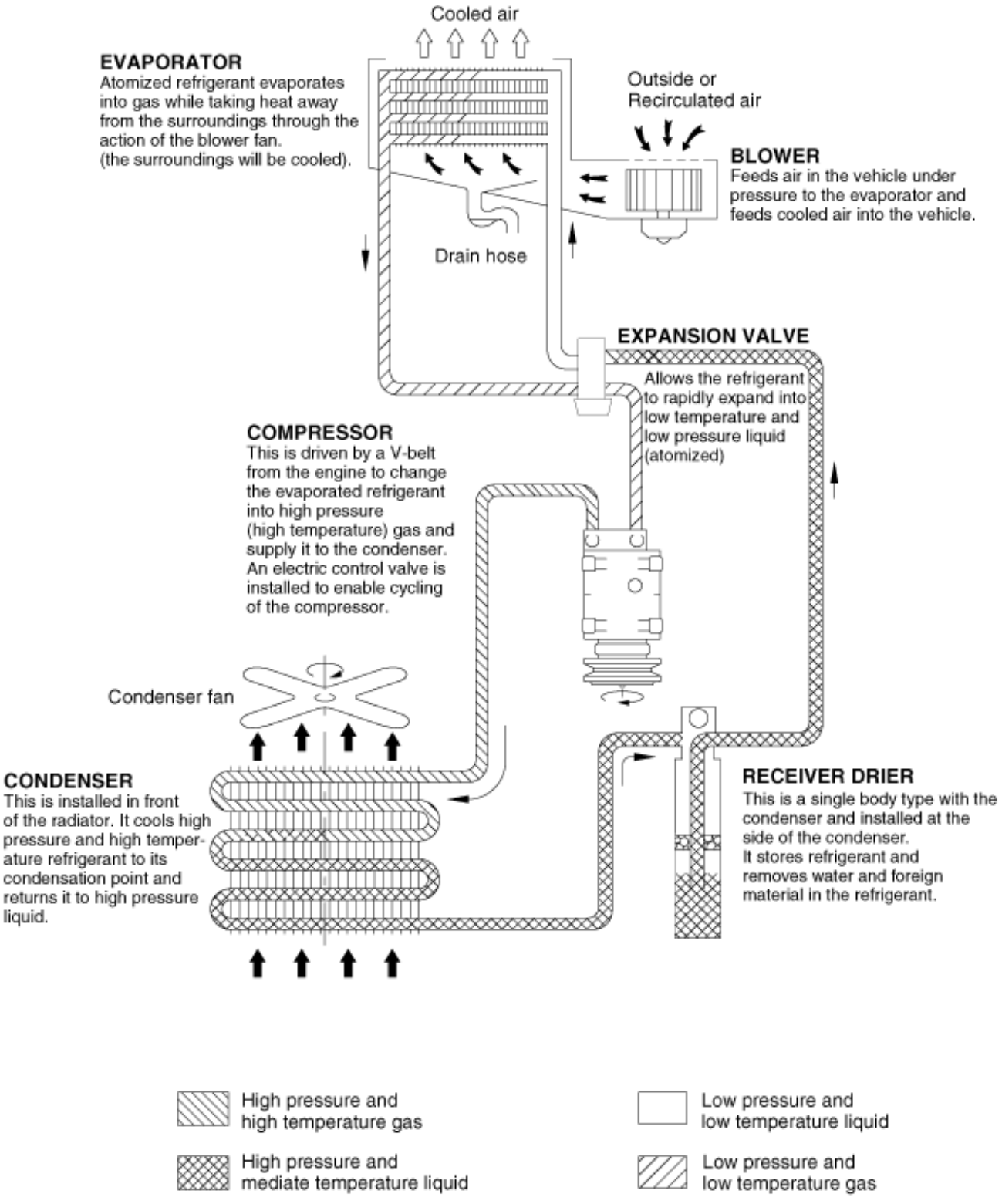
Handling Tubing and Fittings

The internal parts of the refrigeration system will remain in a state of chemical stability as long as pure moisture-free refrigerant and refrigerant oil are used. Abnormal amounts of dirt, moisture or air can upset the chemical stability and cause problems or serious damage.

The Following Precautions Must Be Observed

1. When it is necessary to open the refrigeration system, have everything you will need to service the system ready so the system will not be left open any longer than necessary.
2. Cap or plug all lines and fittings as soon as they are opened to prevent entrance of dirt and moisture.
3. All lines and components in parts stock should be capped or sealed until they are ready to be used.
4. Never attempt to rebind formed lines to fit. Use the correct line for the installation you are servicing.
5. All tools, including refrigerant dispensing manifold, gauge set manifold and test hoses, should be kept clean and dry.

- Refrigeration Cycle


Cooled air
EVAPORATOR
Atomized refrigerant evaporates into gas while taking heat away from the surroundings through the action of the blower fan.
(the surroundings will be cooled).
Outside or Recirculated air
BLOWER
Feeds air in the vehicle under pressure to the evaporator and feeds cooled air into the vehicle.
Drain hose
EXPANSION VALVE
Allows the refrigerant to rapidly expand into low temperature and low pressure liquid (atomized)
COMPRESSOR
This is driven by a V-belt from the engine to change the evaporated refrigerant into high pressure (high temperature) gas and supply it to the condenser.
An electric control valve is installed to enable cycling of the compressor.
Condenser fan
CONDENSER
This is installed in front of the radiator. It cools high pressure and high temperature refrigerant to its condensation point and returns it to high pressure liquid.
RECEIVER DRIER
This is a single body type with the condenser and installed at the side of the condenser.
It stores refrigerant and removes water and foreign material in the refrigerant.
High pressure and high temperature gas
Low pressure and low temperature liquid
High pressure and mediate temperature liquid
Low pressure and low temperature gas

- Refrigerant System Service Basics

Refrigerant Identification

- Do not mix R-1234yf in the vehicle with other refrigerant, such as R-12, R-134a and etc.
- Use only service equipment that is U.L-listed and is certified to meet the requirements of SAE standards to recover and recycle R-1234yf from the air conditioning system. Do not use service equipment for the other refrigerant, such as R-12, R-134a and etc.
- Verify what refrigerant is in the system if there is concern that the system has been tampered with in any way and check the type and quantity of refrigerant that shall be in the A/C system and potential issues arising from accidental or intentional mixing of refrigerants.
- Using an SAE certified refrigerant identification device is recommended to prevent improper recovery and the resulting further spread of contaminated refrigerant, which could potentially damage other A/C systems and service equipment. Contaminated refrigerant (blend of more than one refrigerant or non-system refrigerant) in recovery/recycling equipment could lead to the potential contamination of more refrigerant.
- Certain types of electronic leak detection devices (heated diode or corona discharge) as well as motors, switches, and controls on recovery and recycling machines, could generate sparks that could serve as ignition sources in the presence of refrigerants classified as flammable (A2 or A3) by ASHRAE standard 34 2006.
- It is possible that the mixing of refrigerants in a A/C system can result in higher-than-expected system pressures, system and component damage, diagnostic errors and/or other potential hazards to people and environment.
- In case other refrigerant is mixed, recover the contaminated refrigerant in the A/C system and dispose it in accordance with all applicable national, regional or local regulations. Clean inside the A/C system using the specialized detergent and recharge new refrigerant.

Refrigerant Recovery

Use only service equipment that is U.L-listed and is certified to meet the requirements of SAE standards to remove R-1234yf from the air conditioning system.

⚠ CAUTION

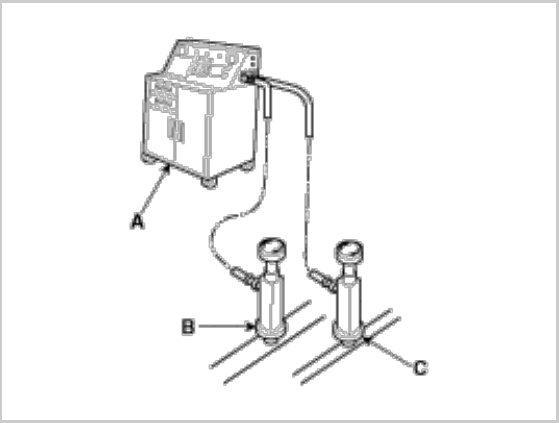
- Air conditioning refrigerant or lubricant vapor can irritate your eyes, nose, or throat.
- Be careful when connecting service equipment.
- Do not breathe refrigerant or vapor.

If accidental system discharge occurs, ventilate work area before resume of service.

Additional health and safety information may be obtained from the refrigerant and lubricant manufacturers.

[Lamda Engine]

1. Connect an R-1234yf refrigerant Recovery / Recycling / Charging System (A) to the high-pressure service port (B) and the low-pressure service port (C) as shown, following the equipment



2. Measure the amount of refrigerant oil removed from the A/C system after the recovery process is completed. Be sure to install the same amount of new refrigerant oil back into the A/C system before charging.

System Evacuation

Use only service equipment that is U.L-listed and is certified to meet the requirements of SAE standards to remove R-1234yf from the air conditioning system.

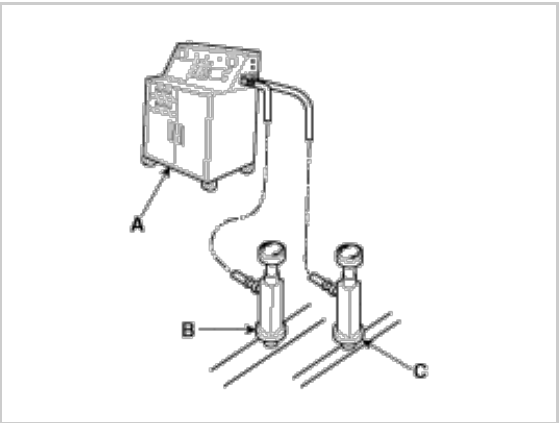
⚠ CAUTION

- Air conditioning refrigerant or lubricant vapor can irritate your eyes, nose, or throat.
- Be careful when connecting service equipment.
- Do not breathe refrigerant or vapor.

If accidental system discharge occurs, ventilate work area before resume of service.

Additional health and safety information may be obtained from the refrigerant and lubricant manufacturers.

1. When an A/C System has been opened to the atmosphere, such as during installation or repair, it must be evacuated using an R-1234yf refrigerant Recovery/Recycling/Charging System. (If the system has been open for several days, the receiver/dryer should be replaced, and the system should be evacuated for several hours.)
2. Connect an R-1234yf refrigerant
   Recovery/Recycling/Charging System (A) to the high-pressure service port (B) and the low-pressure service port (C) as shown, following the equipment manufacturer's instructions.



3. If the low-pressure does not reach more than 87.7 kPa (658 mmHg, 25.9 in.Hg) in 5 minutes, there is probably a leak in the system. Partially charge the system, and check for leaks (see "Refrigerant Leak Test").
4. Remove the low pressure valve from the low-pressure service port.

System Charging

Use only service equipment that is U.L-listed and is certified to meet the requirements of SAE standards to remove R-1234yf from the air conditioning system.

⚠ CAUTION

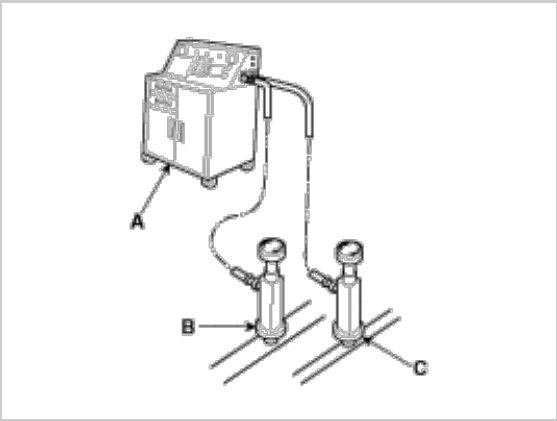
- Air conditioning refrigerant or lubricant vapor can irritate your eyes, nose, or throat.
- Be careful when connecting service equipment.
- Do not breathe refrigerant or vapor.

If accidental system discharge occurs, ventilate work area before resume of service.

Additional health and safety information may be obtained from the refrigerant and lubricant manufacturers.

1. Connect an R-1234yf refrigerant

   Recovery/Recycling/Charging System (A) to the high-pressure service port (B) as shown, following the equipment manufacturer's instructions.



2. Add the same amount of new refrigerant oil to the system that was removed during recovery. Use only specified refrigerant oil. Charge the system with 850 ± 25 g (29.9 ± 0.88 oz.) R-1234yf refrigerant. Do not overcharge the system the compressor will be damaged.

Refrigerant Leak Test

Always conduct a leak test with an electronic leak detector whenever leakage or refrigerant is suspected and when conducting service operations which are accompanied by disassembly or loosening or connection fittings.

NOTICE

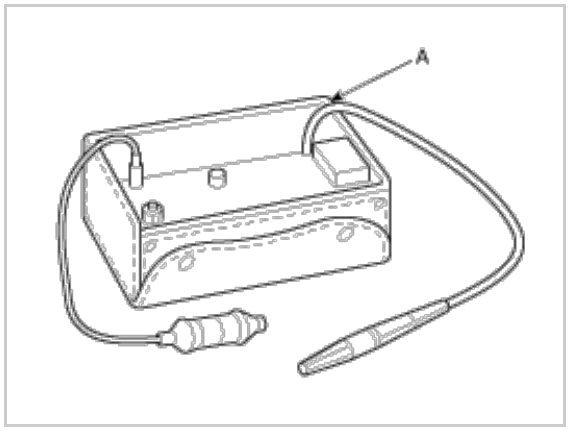
- In order to use the leak detector properly, read the manual supplied by the manufacturer.

⚠ CAUTION

- Use only leak detection devices certified to SAE standards for use with R-1234yf. Certain leak detection devices (heated diode or corona discharge) could serve as ignition sources in the presence of hydrocarbons or other flammable refrigerants.

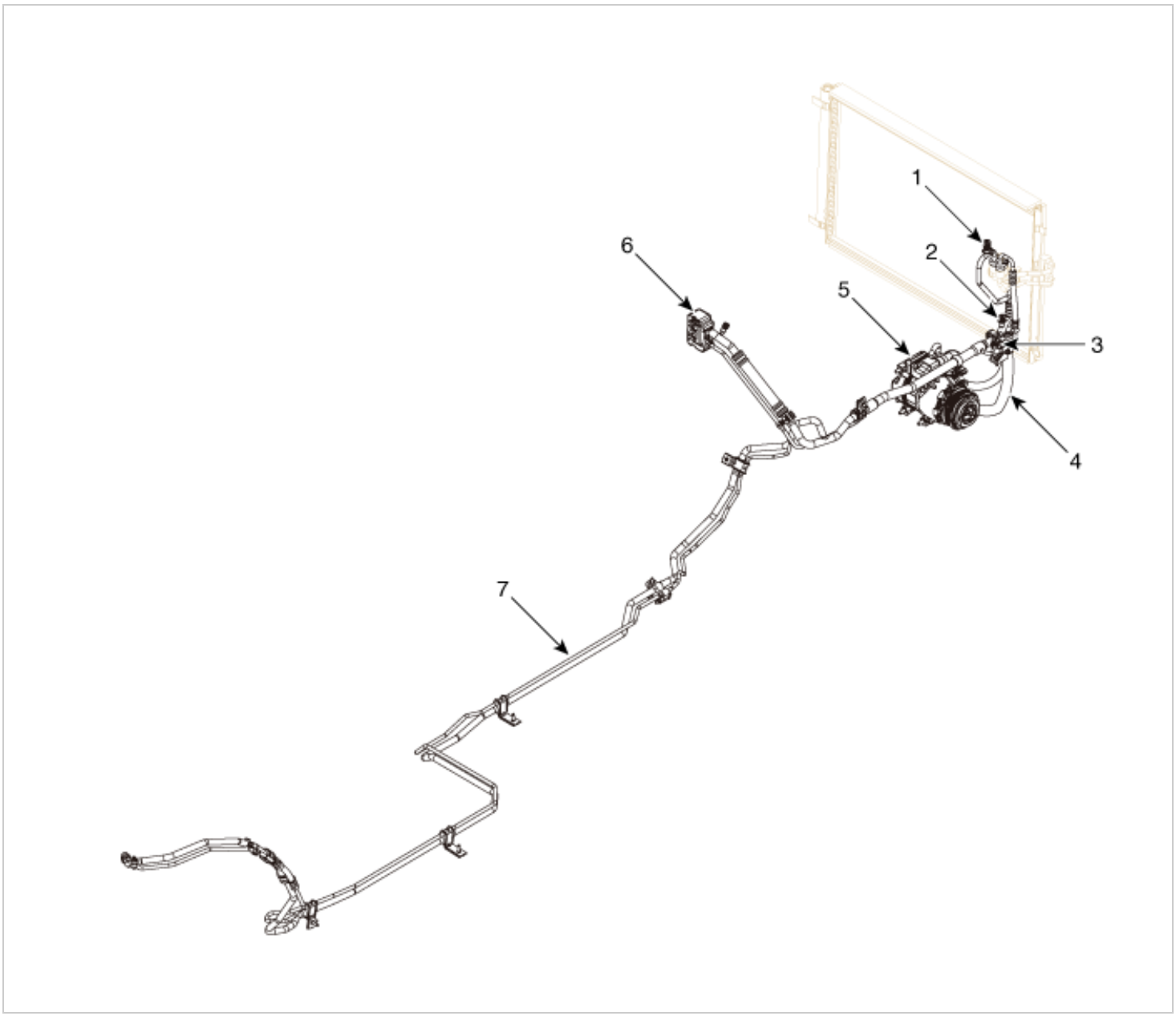
If a gas leak is detected, proceed as follows :

1. Check the torque on the connection fittings and, if too loose, tighten to the proper torque. Check for gas leakage with a leak detector (A).
2. If leakage continues even after the fitting has been tightened, discharge the refrigerant from the system, disconnect the fittings, and check their seating faces for damage. Always replace, even if the damage is slight.
3. Check the compressor oil and add oil if required.
4. Charge the system and recheck for gas leaks. If no leaks are found, evacuate and charge the system again.



- Component Location Index

Engine Room



1. Service port (High pressure)
2. Service port (Low pressure)
3. A/C pressure transducer (APT)
4. Suction & Liquid tube assembly
5. Compressor
6. Expansion valve
7. Suction & Liquid pipe assembly

Interior

1. Heater & A/C control unit
4. Heater & Blower unit

2. Auto defogging sensor
3. Photo sensor
5. Climate control air filter

- Oil Specification

1. The R-134a system requires synthetic (PAG) compressor oil whereas the R-12 system requires mineral compressor oil. The two oils must never be mixed.
2. Compressor (PAG) oil varies according to compressor model. Be sure to use oil specified for the model of compressor.

Handling of Oil

1. The oil should be free from moisture, dust, metal powder, etc.
2. Do not mix with other oil.
3. The water content in the oil increases when exposed to air. After use, seal oil from air immediately. (R-134a Compressor Oil absorbs moisture very easily.)
4. The compressor oil must be stored in steel containers, not in plastic containers.

Compressor Oil Check

The oil used to lubricate the compressor circulates with the refrigerant.
Whenever replacing any component of the system or a large amount of gas leakage occurs, add oil to maintain the original amount of oil.

Oil total volume in system :
PAG 30 : 180 ± 10 cc (6.3 ± 0.3 oz.)

Oil Return Operation

There is close affinity between the oil and refrigerant.
During normal operation, part of the oil recirculates with the refrigerant in the system. When checking the amount of oil in the system, or replacing any component of the system, the compressor must run in advance for oil return operation. The procedure is as follows :

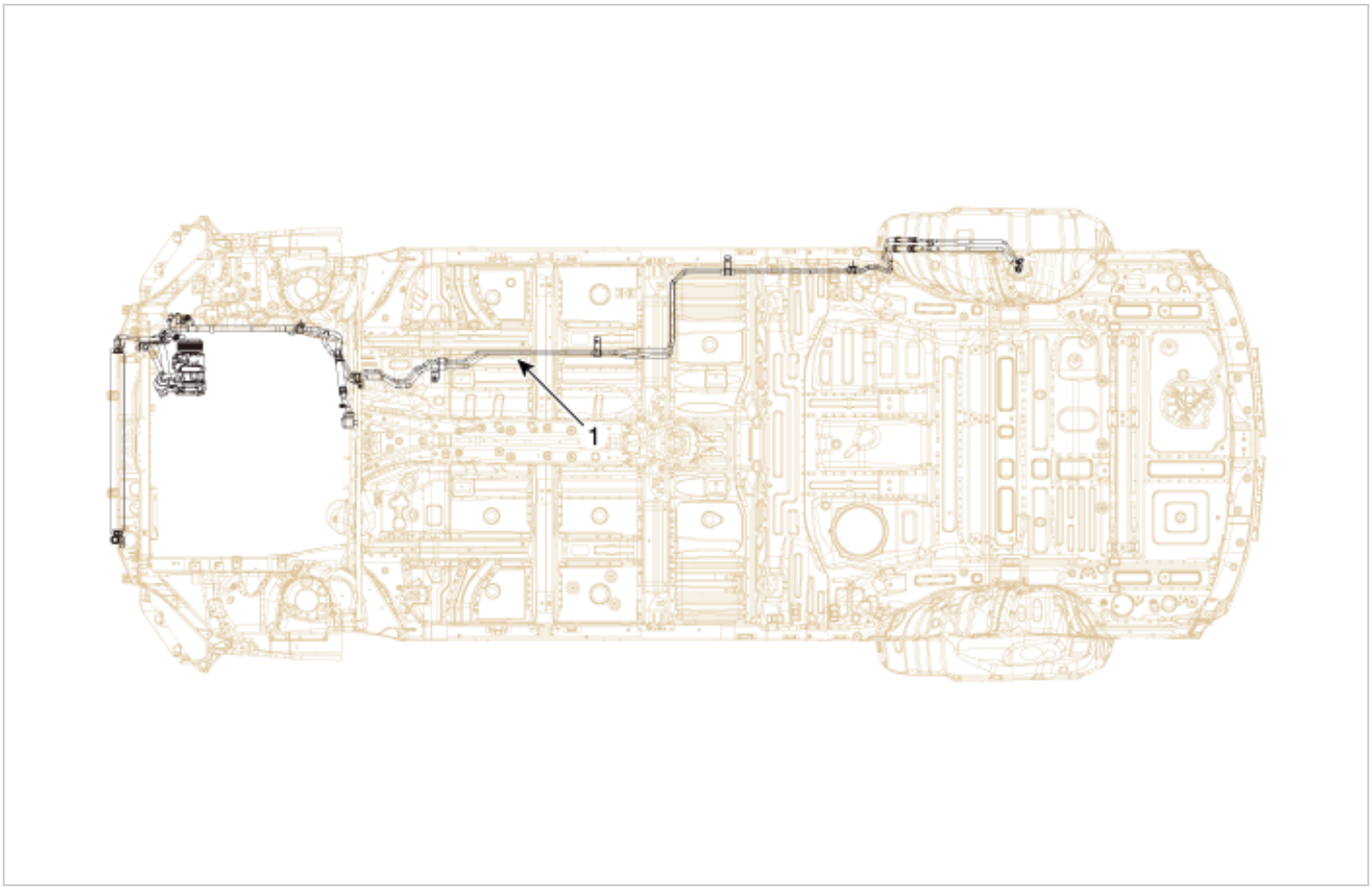
1. Open all the doors and engine hood.
2. Start the engine and air conditioning switch to "ON" and set the blower motor control knob at its highest position.
3. Run the compressor for more than 20 minutes between 800 and 1,000 rpm in order to operate the system.
4. Stop the engine.

- Components

[Isometric view]

1. Front suction & Liquid pipe assembly

[Top view]



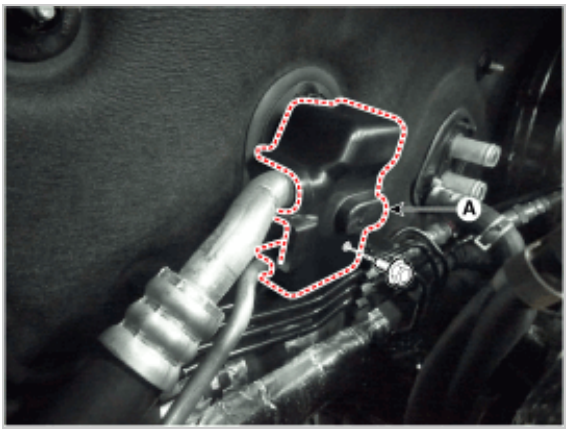
1. Front suction & Liquid pipe assembly

- Replacement

[Front suction & Liquid pipe assembly]

1. If a compressor is available, the air conditioner is operated for a few minutes in the engine idle state and then the engine is stopped.
2. Disconnect the negative (-) battery terminal.
3. Recover the refrigerant with a recovery/charging station.
4. Remove the engine cover.
   (Refer to Engine Mechanical System - "Engine Cover")
5. Loosen the mounting nut and remove the expansion valve cover (A).

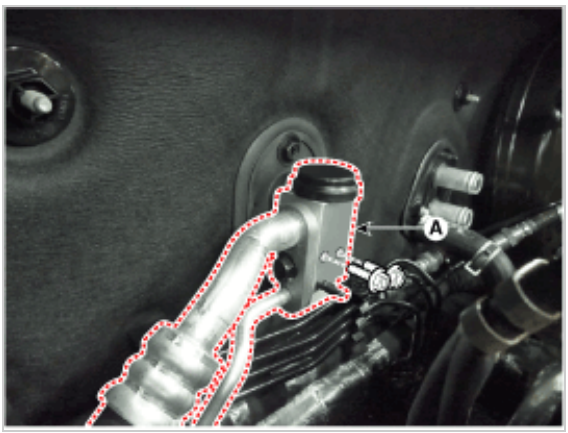
Tightening torque :
8.8 - 12.7 N.m (0.9 - 1.3 kgf.m, 6.5 - 9.4 lb-ft)



6. Loosen the mounting bolts and separate the expansion valve (A) fron evaporator core.

Tightening torque :

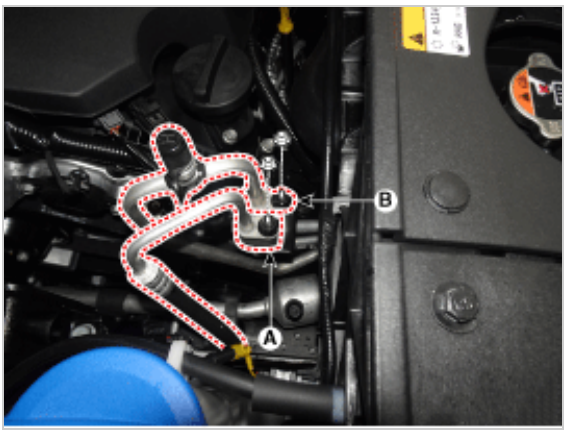
8.8 - 13.7 N.m (0.9 - 1.4 kgf.m, 6.5 - 10.1 lb-ft)



7. Loosen the mounting nuts and separate the suction line (A), discharge line (B).

Tightening torque :

20.0 - 23.7 N.m (2.0 - 2.4 kgf.m, 14.8 - 17.5 lb-ft)



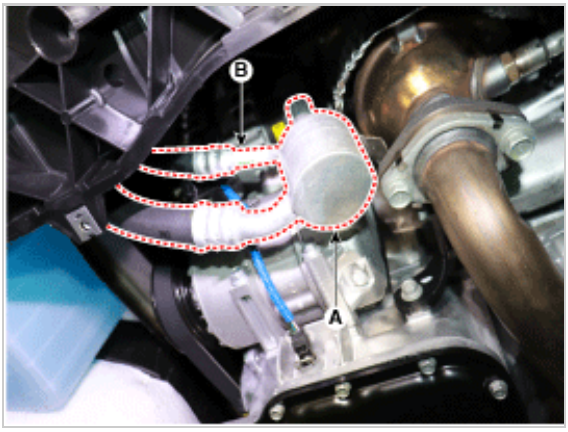
8. Press the lock pin and separate the APT (Air conditioning Pressure Transducer) sensor connector (A).

9. Remove the engine room under cover.
   (Refer to Engine Mechanical System - "Engine Room Under Cover")
10. Remove the engine mounting braket.
    (Refer to Engine Mechanical System - "Engine Mounting")
11. Separate the compressor suction line (A) and discharge line (B) connection nuts and disconnect the line.

Tightening torque :
20.9 - 31.2 N.m (2.1 - 3.2 kgf.m, 15.4 - 23.0 lb-ft)

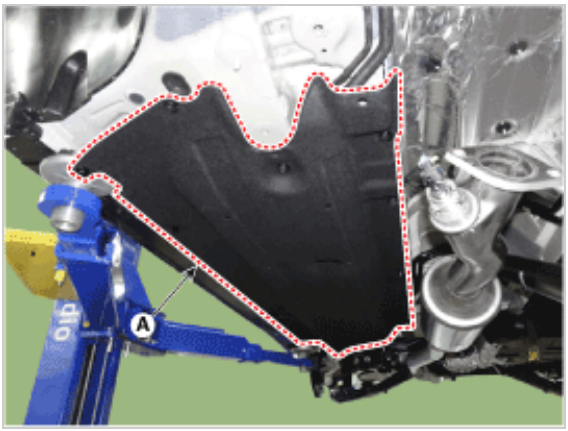
NOTICE

- Be careful not to damage the parts located under the vehicle (floor under cover, fuel filter, fuel tank and canister) when raising the vehicle using the lift.
  (Refer to General Information - "Lift and Support Points")



12. Loosen the mounting bolts, nuts and remove the engine room under cover [RH] (A).

Tightening torque
8.8 - 13.7 N.m (0.9 - 1.4 kgf.m, 6.5 - 10.1 lb-ft)



13. Remove the refrigerant pipe line mounting nuts and braket bolt.

Tightening torque :

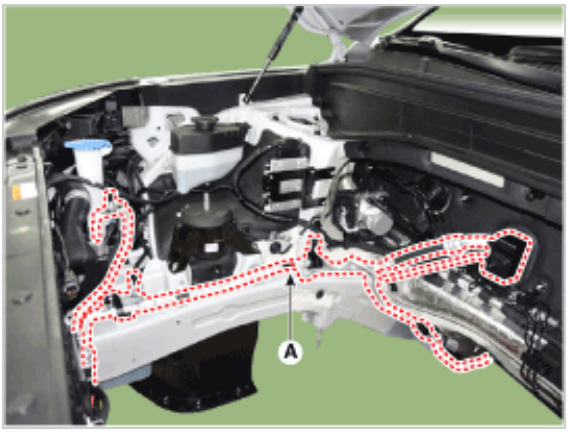
Nut : 8.8 - 13.7 N.m (0.9 - 1.4 kgf.m, 6.5 - 10.1 lb-ft)

Bolt : 7.8 - 11.8 N.m (0.8 - 1.2 kgf.m, 5.8 - 8.7 lb-ft)

14. Loosen the mounting bolt and remove the Front suction & Liquid pipe assembly (A).

Tightening torque :

7.8 - 11.8 N.m (0.8 - 1.2 kgf.m, 5.8 - 8.7 lb-ft)



15. To install, reverse removal procedure.

Information

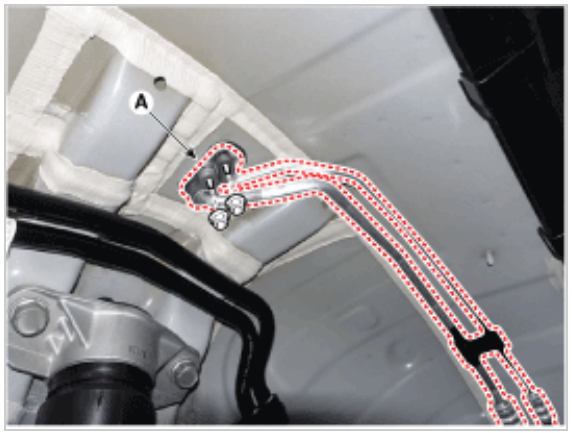
- Plug or cap the lines immediately after disconnecting them to avoid moisture and dust contamination.
- Tighten the bolt or nut joint to the specified torque.
- Using a gas leak detector, check for refrigerant leakage.

• Evacuate air in the refrigeration system and charge system with refrigerant.

[Rear Suction & Liquid Pipe Assembly]

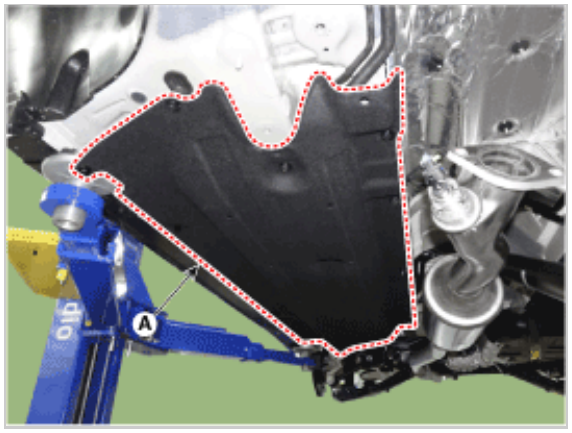
1. If a compressor is available, the air conditioner is operated for a few minutes in the engine idle state and then the engine is stopped.
2. Disconnect the negative (-) battery terminal.
3. Recover the refrigerant with a recovery/charging station.
4. Remove the rear wheel guard [RH].
   (Refer to Body - "Rear Wheel Guard")
5. Loosen the mounting nuts and separate the suction line, discharge line (A).

   Tightening torque :
   8.8 - 12.7 N.m (0.9 - 1.3 kgf.m, 6.5 - 9.4 lb-ft)



6. Loosen the mounting bolts, nuts and remove the engine room under cover [RH] (A).

   Tightening torque :
   8.8 - 13.7 N.m (0.9 - 1.4 kgf.m, 6.5 - 10.1 lb-ft)



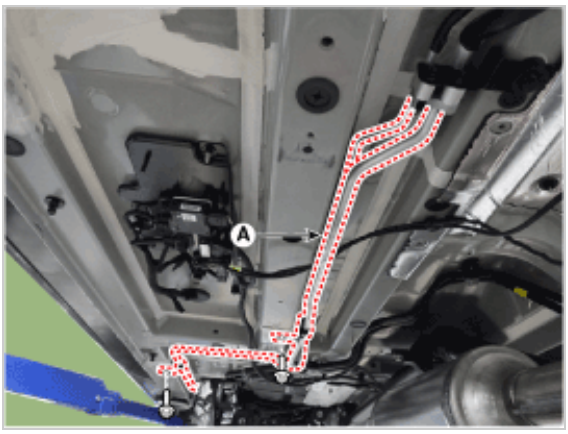
7. Remove the refrigerant pipe line mounting nuts.

   Tightening torque :
   8.8 - 13.7 N.m (0.9 - 1.4 kgf.m, 6.5 - 10.1 lb-ft)

8. Loosen the mounting bolt and remove the Rear suction & Liquid pipe assembly (A).

Tightening torque :

7.8 - 11.8 N.m (0.8 - 1.2 kgf.m, 5.8 - 8.7 lb-ft)



9. To install, reverse removal procedure.

Information

- Plug or cap the lines immediately after disconnecting them to avoid moisture and dust contamination.
- Tighten the bolt or nut joint to the specified torque.
- Using a gas leak detector, check for refrigerant leakage.
- Evacuate air in the refrigeration system and charge system with refrigerant.

- Description

The compressor is the power unit of the A/C system.

It is located on the side of engine block and driven by a V-belt of the engine.

The compressor changes low pressure and low temperature refrigerant gas into high pressure and high temperature refrigerant gas.

Variable Swash Plate Compressor

The compressor has a swash plate that rotates to reciprocate pistons, which compress refrigerant.

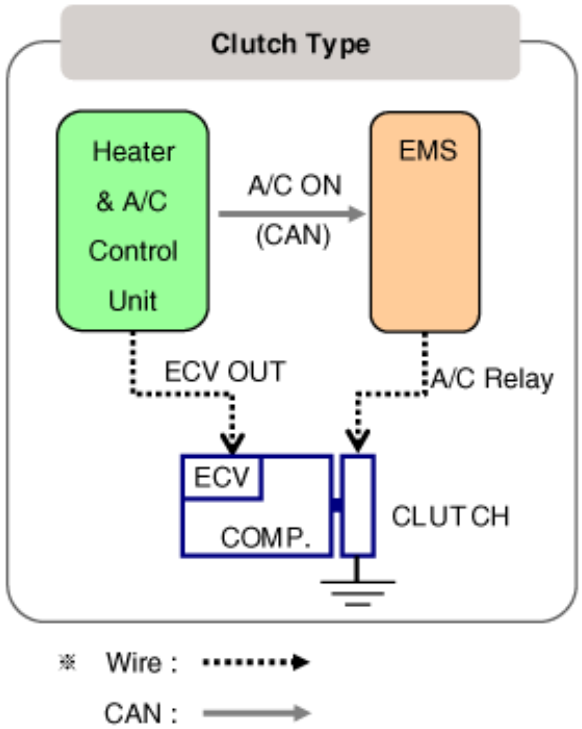
The variable swash plate compressor controls the swash plate angle to change the refrigerant displacement. It achieves precise cooling capability control in accordance with vehicle interior and driving conditions.

The internally controlled variable swash plate compressor changes the swash plate angle by a MCV (Mechanical Control Valve) in accordance with fluctuation of a suction pressure.

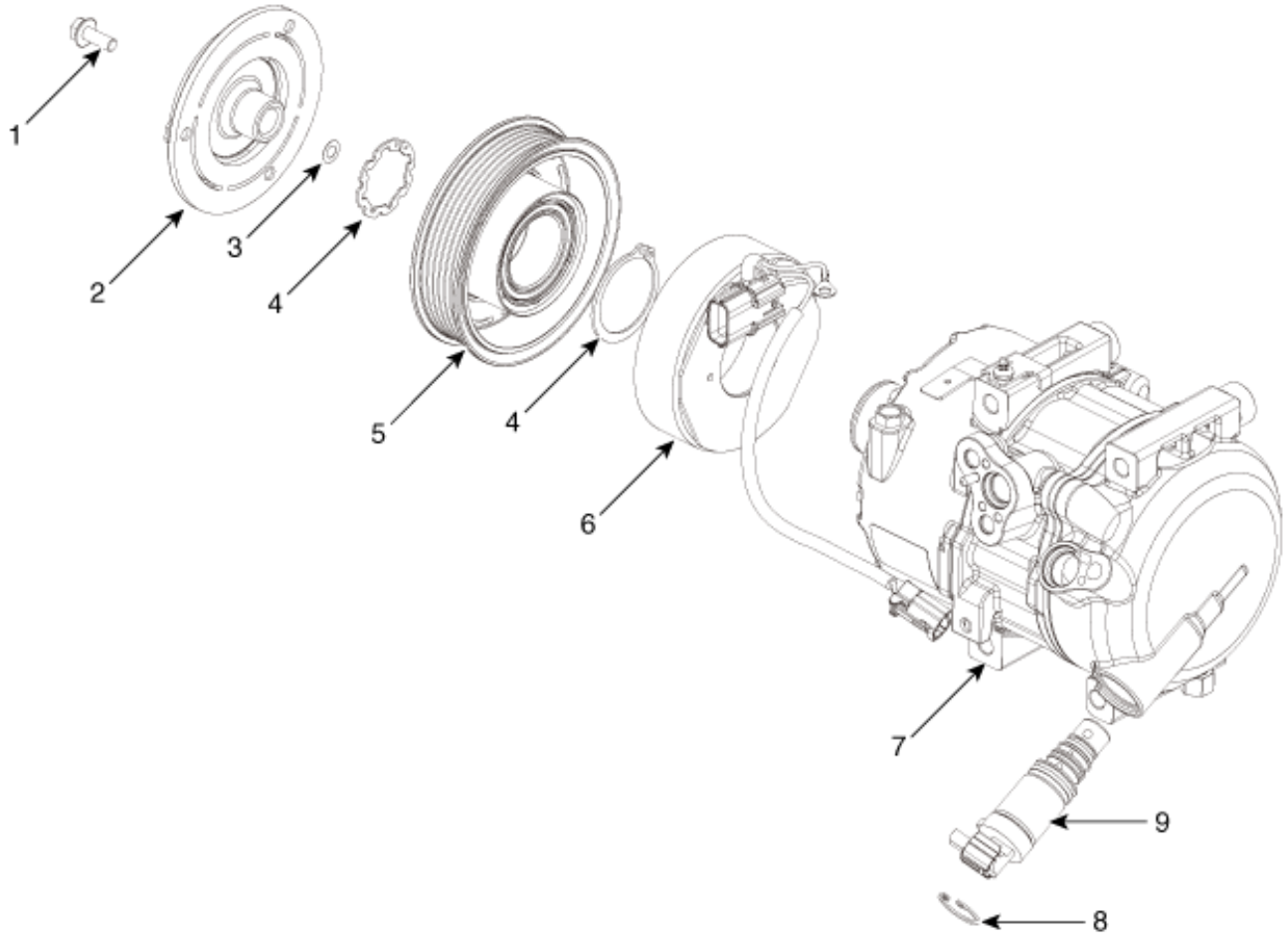
The externally controlled variable swash plate compressor changes the swash plate angle by an ECV (Electric Control Valve) in accordance with an electrical signal from the heater & A/C control unit.

This enables stable temperature control and improved driving sensation.

ECV Control Diagram



- Components



1. Clutch bolt
2. Disc & Hub assembly
3. Clutch hub spacer
4. Snap ring
5. Pulley
6. Clutch magnetic coil
7. Compressor
8. ECV Snap ring
9. Electric Control Valve (ECV)

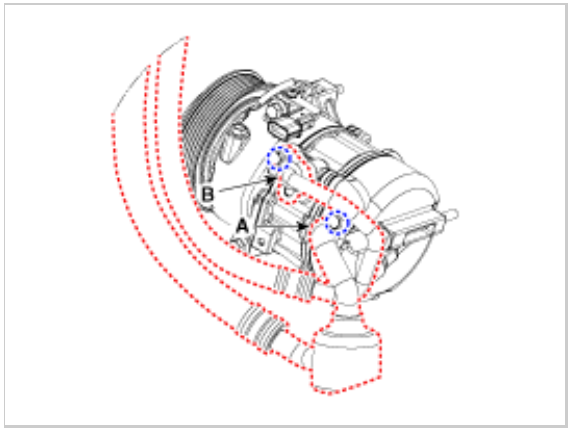
- Removal

1. If a compressor is available, the air conditioner is operated for a few minutes in the engine idle state and then the engine is stopped.
2. Disconnect the negative (-) battery terminal.
3. Recover the refrigerant with a recovery/charging station.
4. Loosen the drive belt.
   (Refer to Engine Mechanical System - "Drive Belt")
5. Loosen the mounting nuts and separate the suction line (A), discharge line (B).

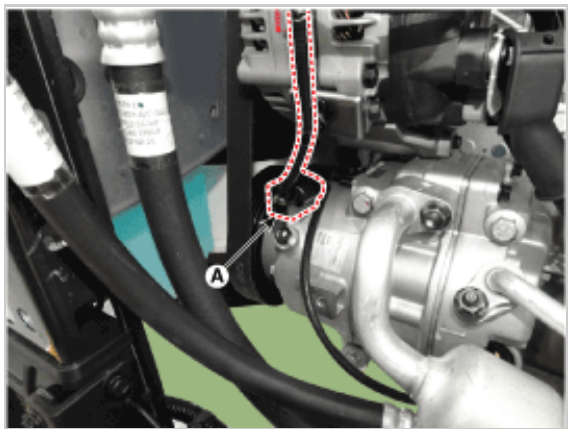
Tightening torque :
20.9 - 31.2 N.m (2.1 - 3.2 kgf.m, 15.4 - 23.0 lb-ft)

NOTICE

• Plug or cap the lines immediately after disconnecting them to avoid moisture and dust contamination.



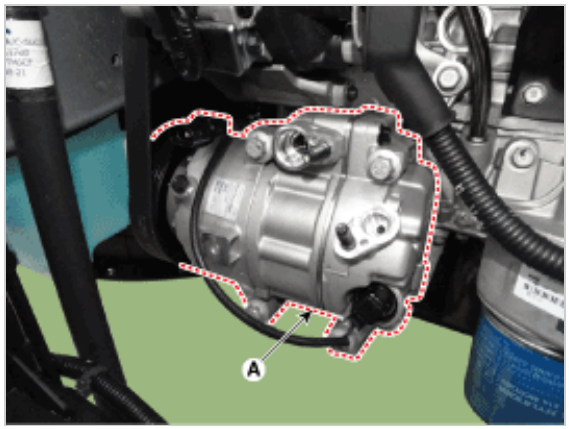
6. Press the lock pin and separate the ECV connector (A).



7. Loosen the mounting bolts and remove the compressor assembly (A).

Tightening torque :

19.6 - 33.3 N.m (2.0 - 3.4 kgf.m, 14.8 - 24.6 lb-ft)



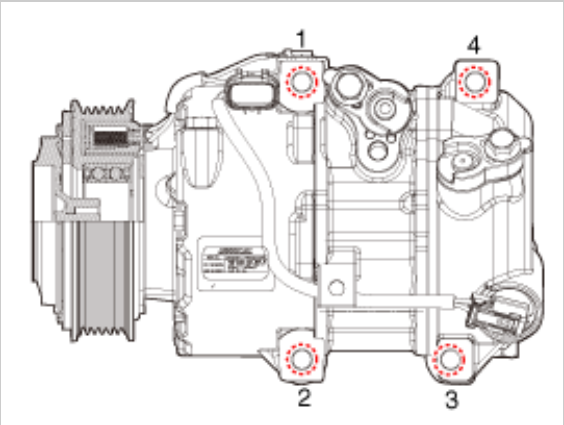
- Installation

1. Make sure that the compressor (A) mounting bolt of the correct length is screwed in. Tighten the mounting bolts in the specified tightening order.

Tightening torque :

20.0 - 33.0 N.m (2.0 - 3.4 kgf.m, 14.8 - 24.3 lb-ft)

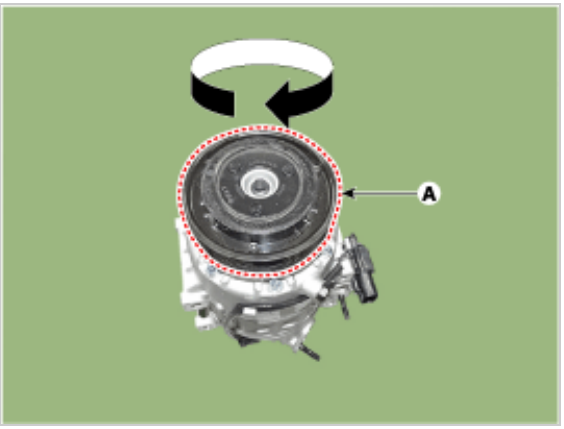
[LAMDA Engine]



2. Install in the reverse order of removal.
   - If you install a new compressor, drain all the refrigerant oil from the removed compressor and measure its volume. Subtract the volume of drained oil from the original capacity. The result is the amount of oilcompressor oil you should drain from the new compressor (through the suction fitting).
   - Replace the O-rings with new ones at each fitting, and apply a thin coat of refrigerant oil before installing them. Be sure to use the right O-rings for R-1234yf to avoid leakage.
   - To avoid contamination, do not return the oil to the container once dispensed, and never mix it with other refrigerant oils.
   - Immediately after using the oil, replace the cap on the container and seal it to avoid moisture absorption.

- Inspection

1. Check the plated parts of the limiter & hub assembly for color changes, peeling or other damage. If there is damage, replace the assembly.
2. Check the pulley (A) bearing play and drag by rotating the pulley by hand. Replace the pulley with a new one if it is noisy or has excessive play / drag.



External Control Valve Compressor Inspection (GDS)

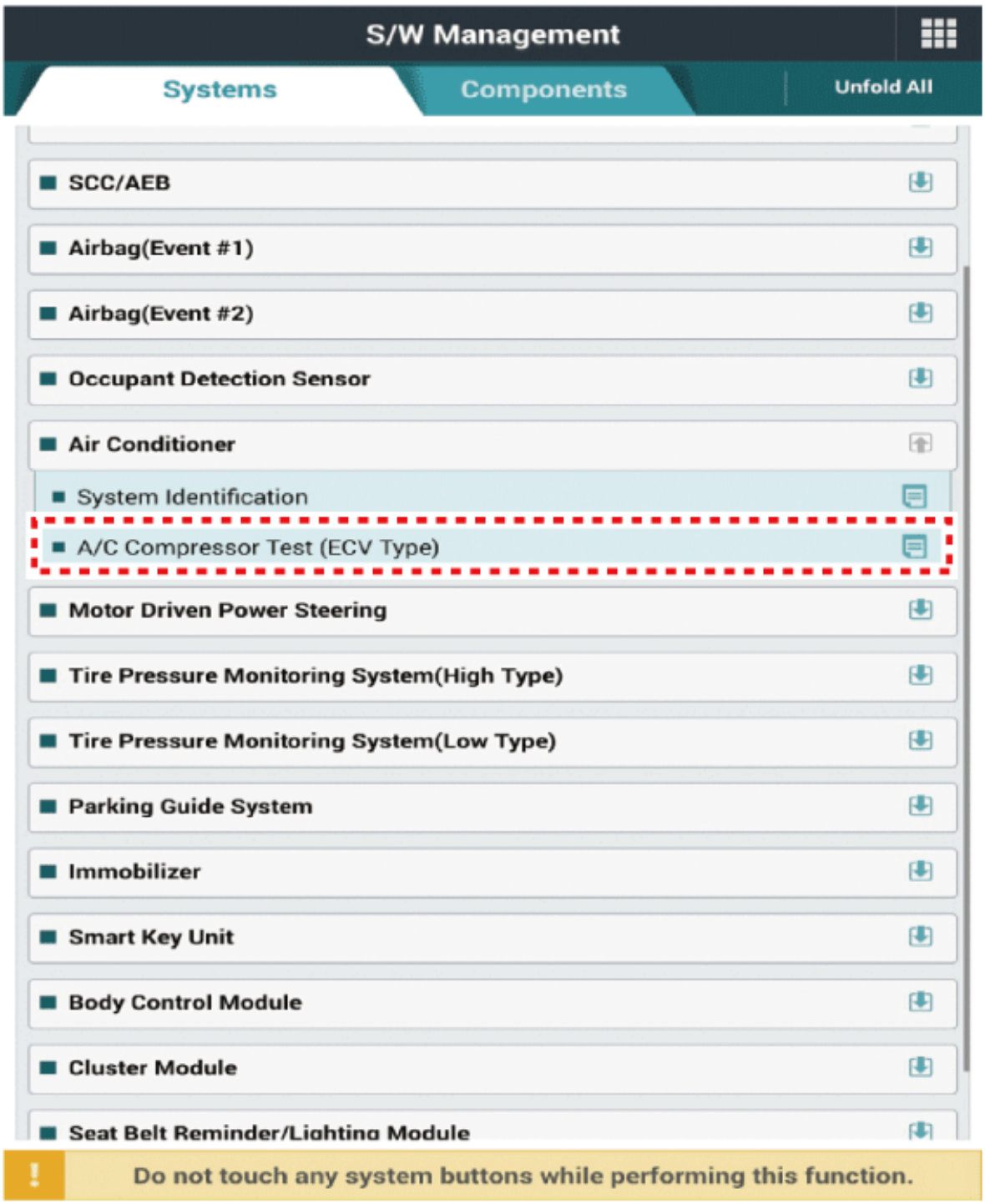
Compressor type: Fixed type compressor, External control valve, Internal control valve.

In cases of fixed type and internal control valve, it is possible to inspect compressor's operation with clutch noise.

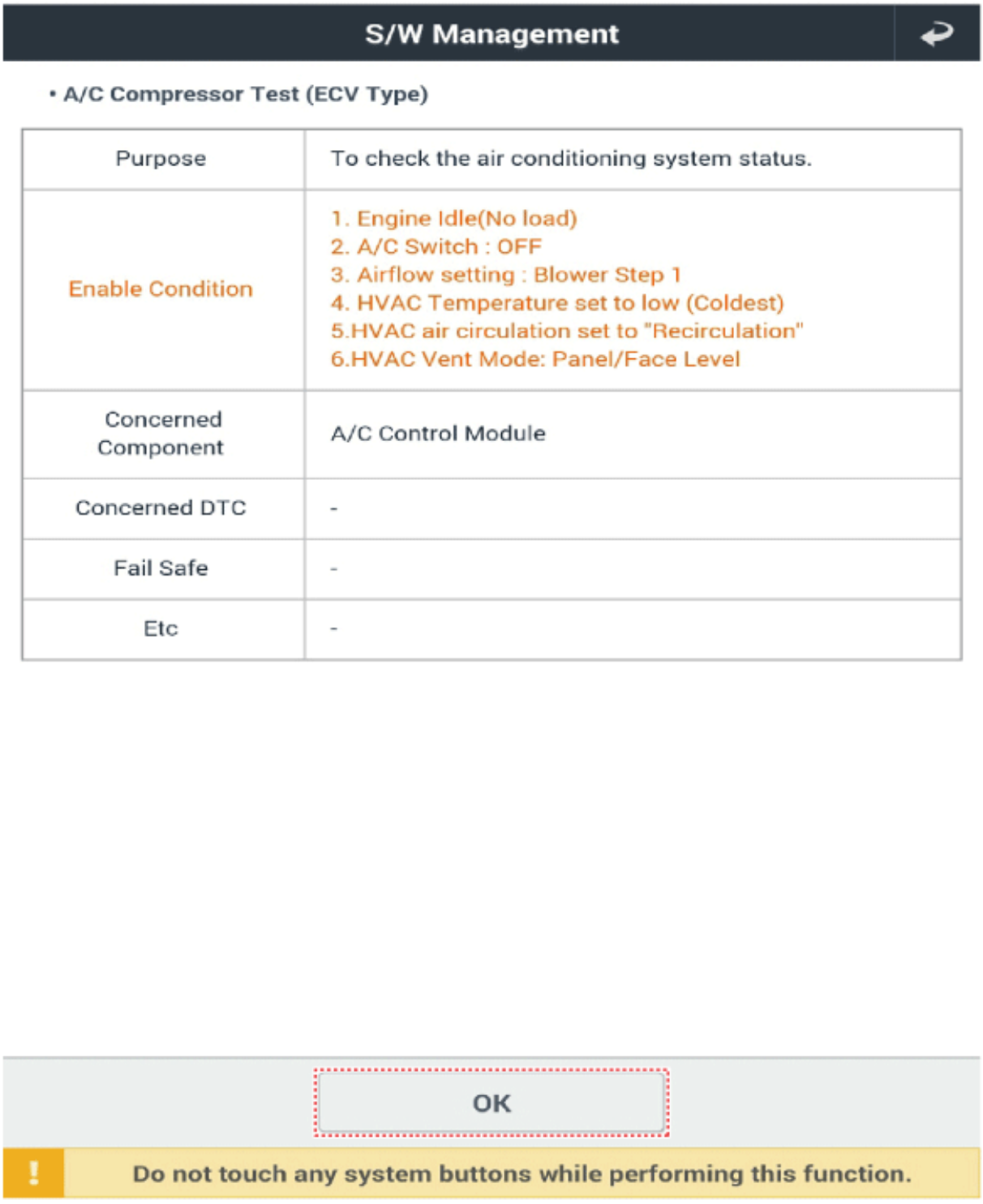
When it comes to External control valve, however, it cannot be checked in this way bacause it doesn't have a clutch.

So, ECV should be inspected with GDS as below.

1. Connect GDS to the vehicle and select 'Aircon Compressor Test(ECV type)'
   [ECV1]



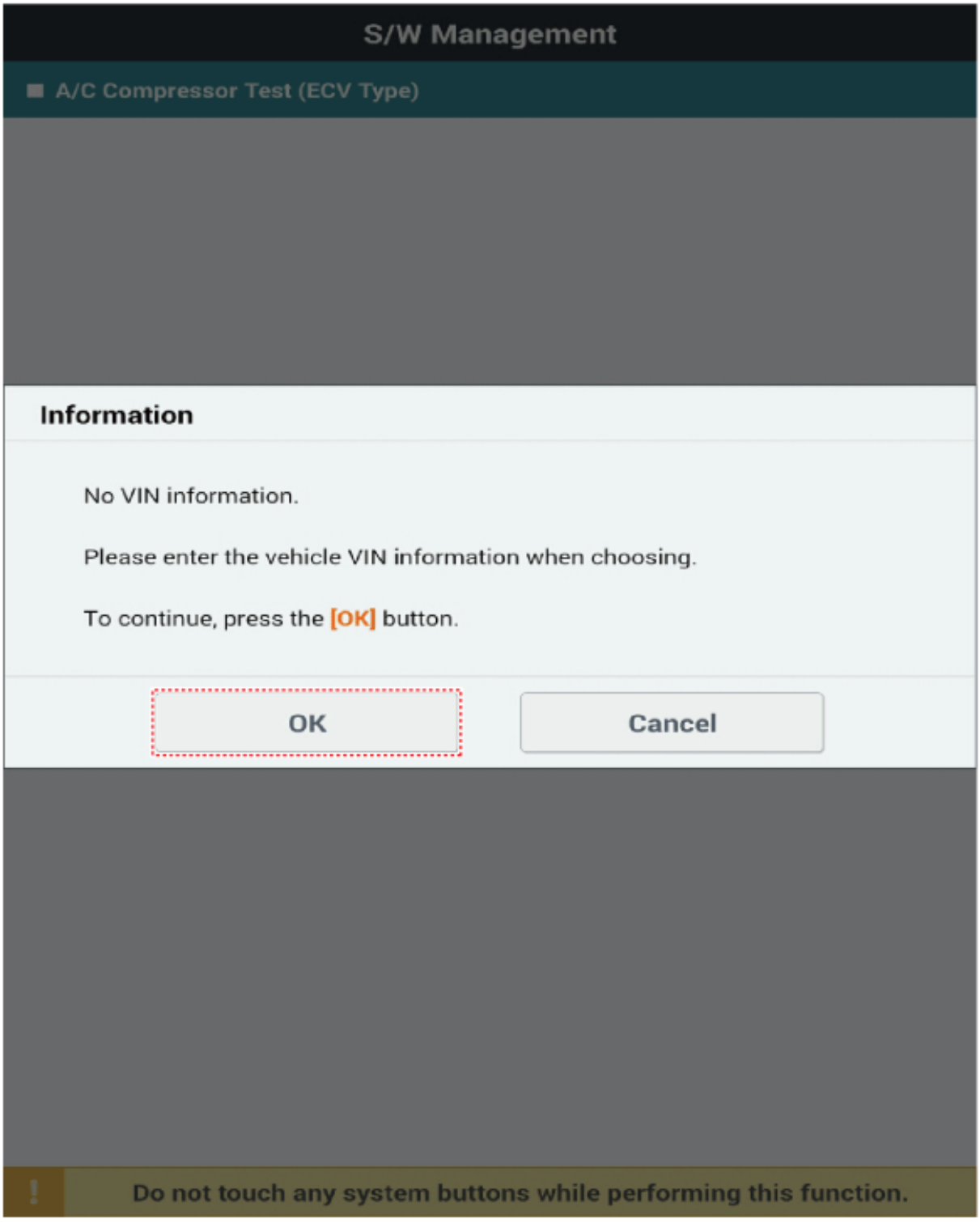
2. Make the vehicle ready as the GDS instruction on the monitor. (Turn off A/C 'switch' only)



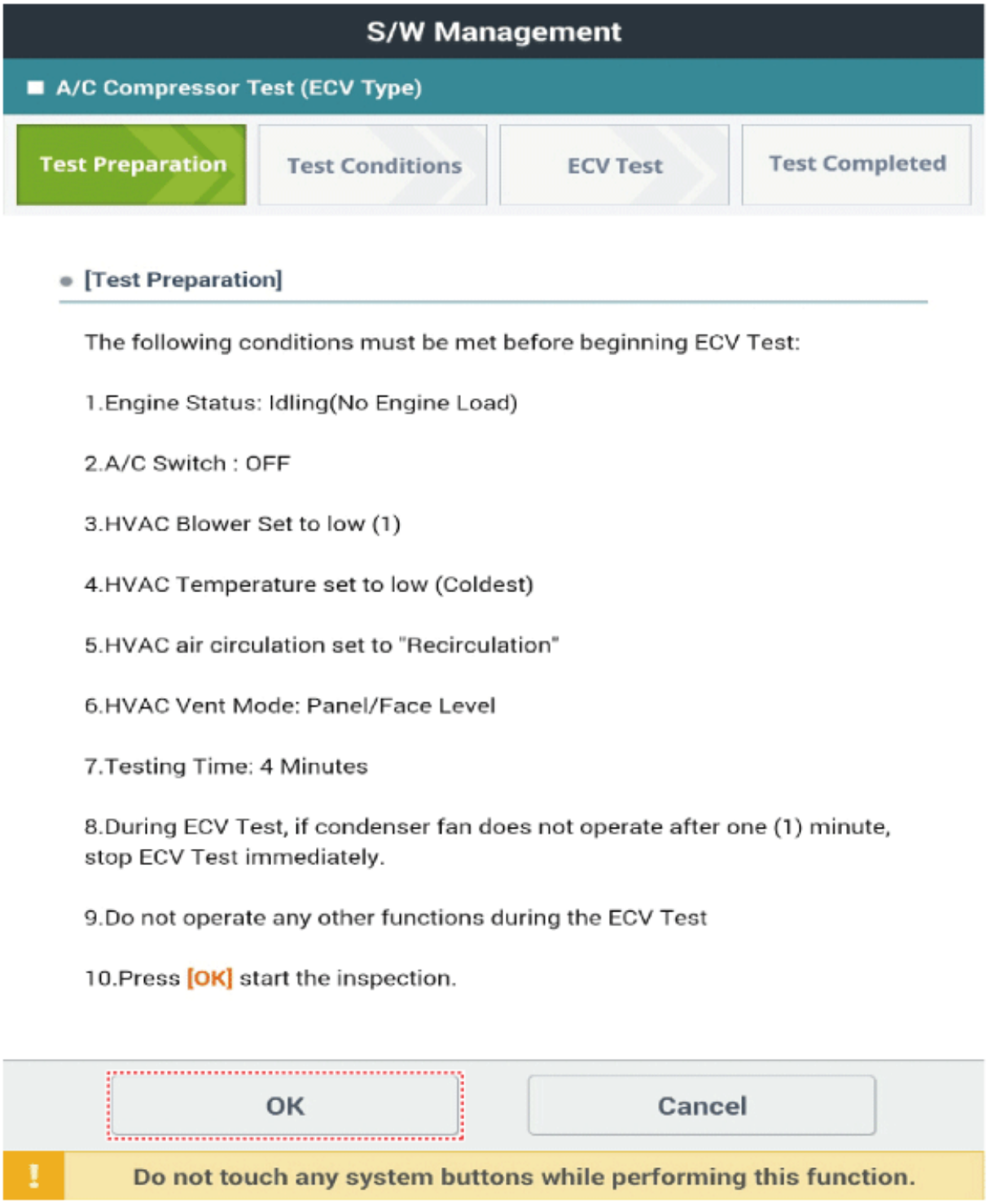
3. Check if other DTC codes are found before inspect ECV compressor. If so, solve that problems first. If not, press 'OK' button to continue.

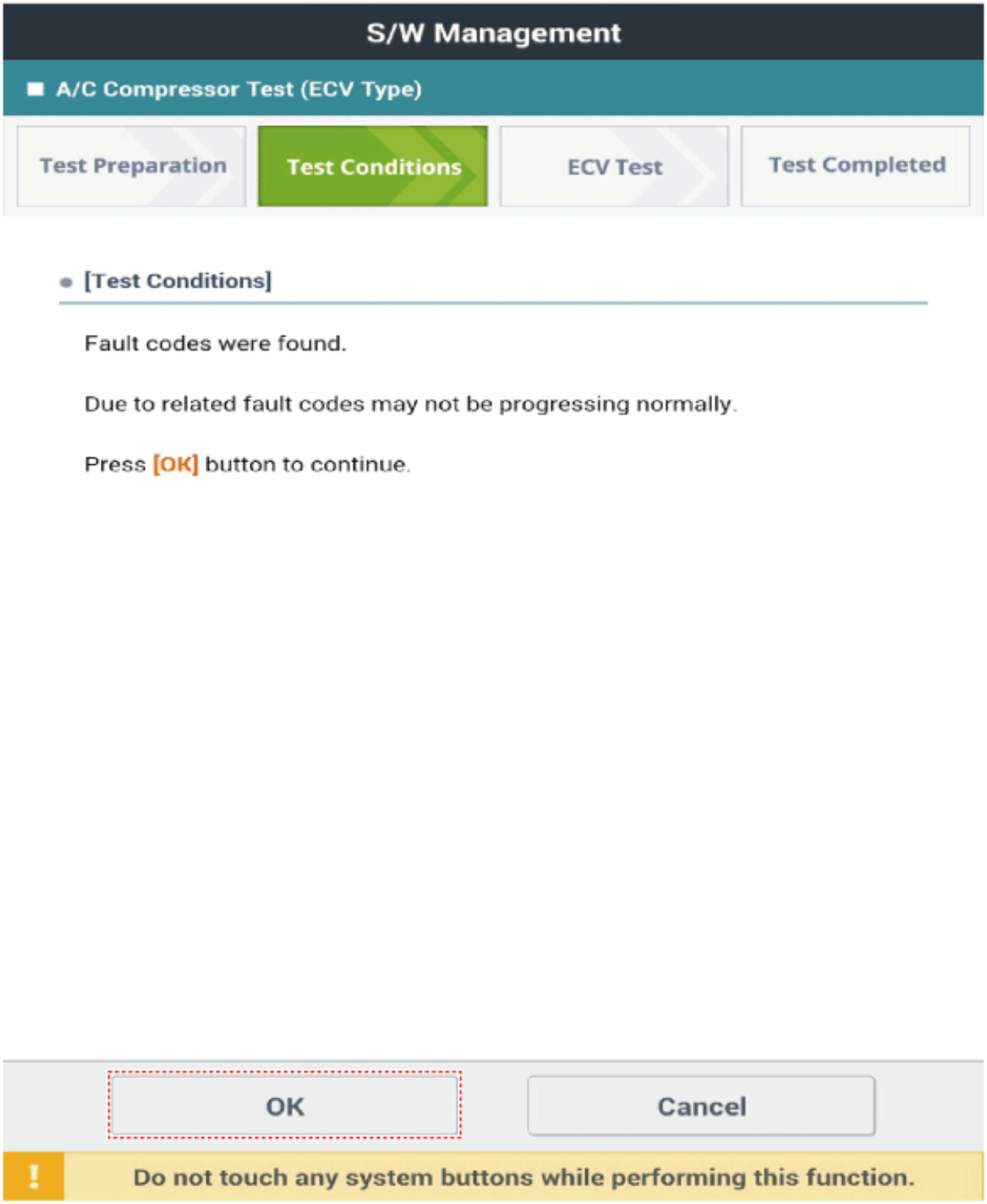
Information

Do not continue inspection if these DTC codes are found: B1241, B1242, B1672, B1685, B1686, B1687


S/W Management
A/C Compressor Test (ECV Type)
Information
No VIN information.
Please enter the vehicle VIN information when choosing.
To continue, press the [OK] button.
OK
Cancel
Do not touch any system buttons while performing this function.

4. Start inspection


S/W Management
A/C Compressor Test (ECV Type)
Test Preparation
Test Conditions
ECV Test
Test Completed
[Test Preparation]
The following conditions must be met before beginning ECV Test:
1.Engine Status: Idling(No Engine Load)
2.A/C Switch : OFF
3.HVAC Blower Set to low (1)
4.HVAC Temperature set to low (Coldest)
5.HVAC air circulation set to "Recirculation"
6.HVAC Vent Mode: Panel/Face Level
7.Testing Time: 4 Minutes
8.During ECV Test, if condenser fan does not operate after one (1) minute, stop ECV Test immediately.
9.Do not operate any other functions during the ECV Test
10.Press [OK] start the inspection.
OK
Cancel
Do not touch any system buttons while performing this function.



⚠ CAUTION

Check if condenser fan is operating when condition is changed to 'ECV running'

⚠ CAUTION

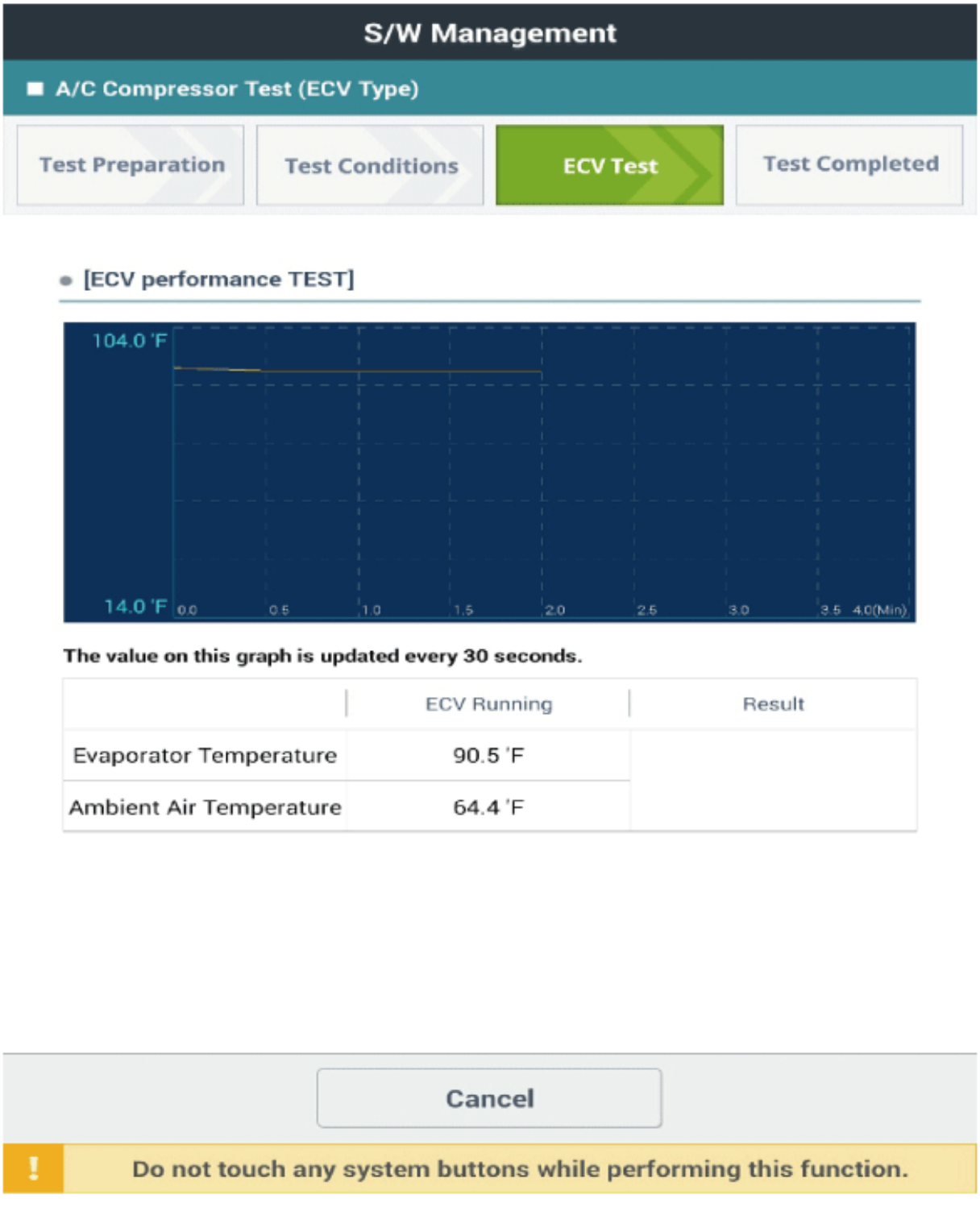
Relief valve will operate if condenser fandoesn't work due to overpressure in thecompressor. It helps the airconditiong system torelieve by releasing refrigerant and oil (losed ifrelieved).

※ Refill refrigerant and oil after operation of relief valve

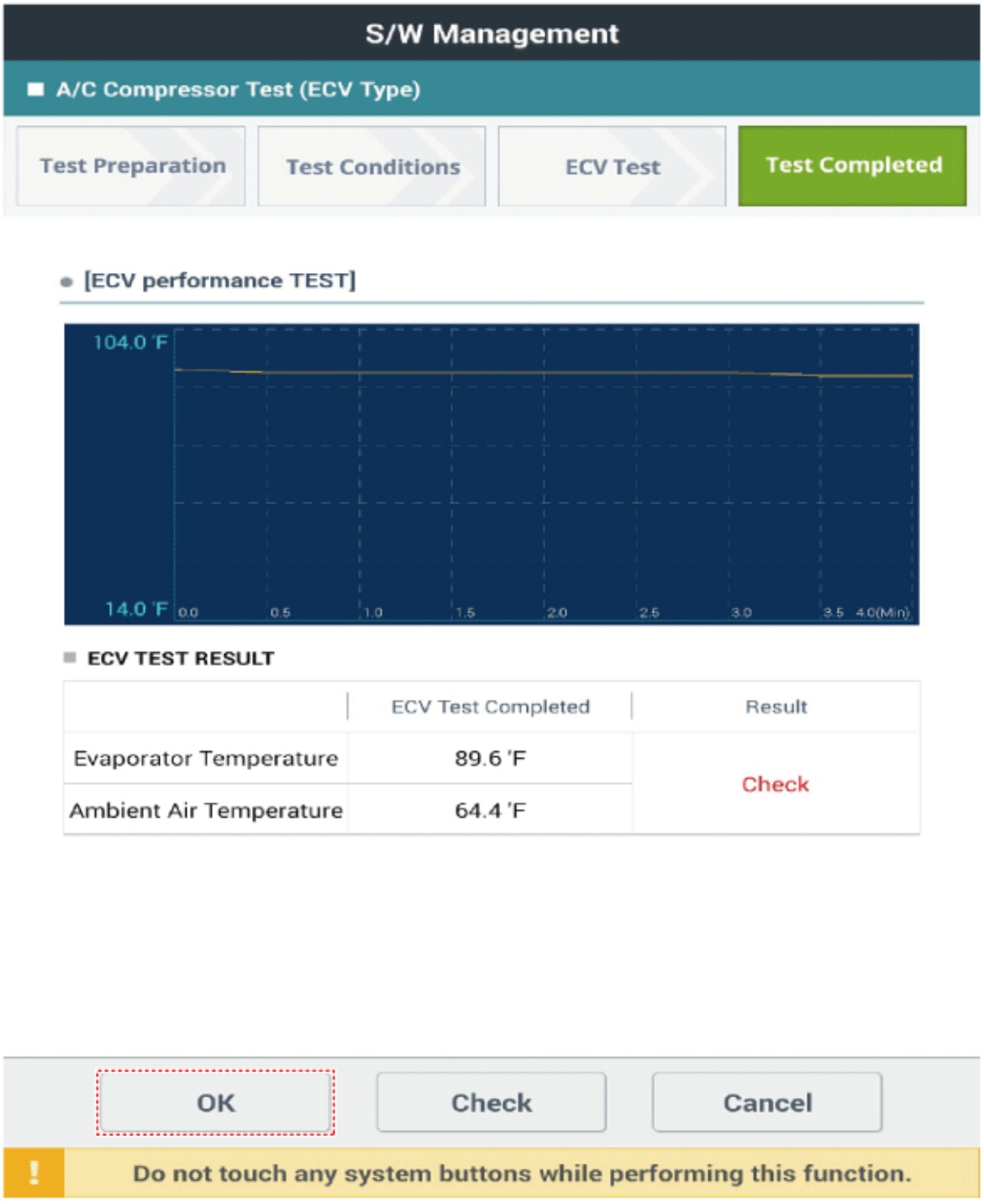
※ Noise occurred when relief valve is in operation

5. Check the result of inspection.

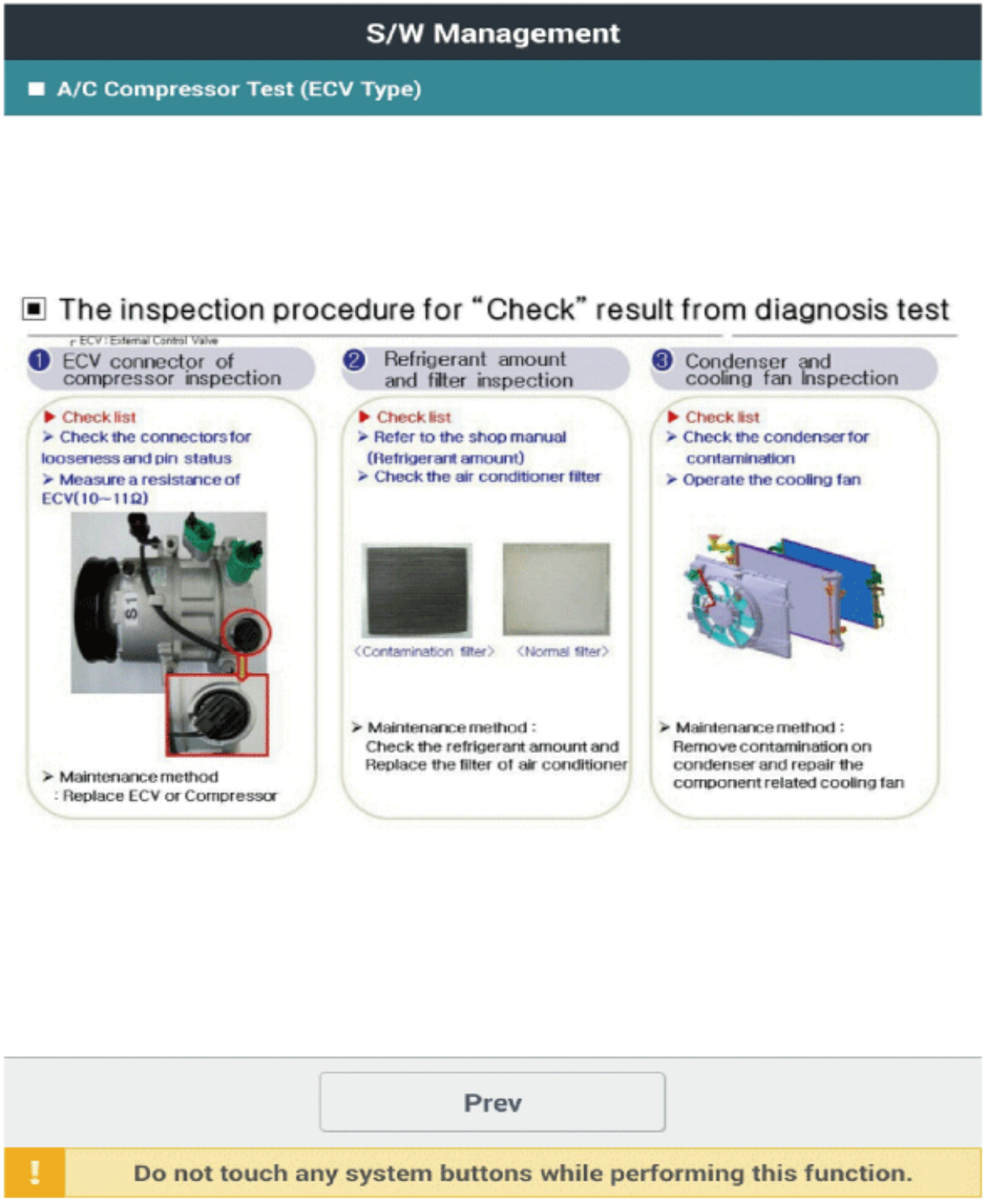
[ECV7]



[ECV8]



6. If the result shows "Check" , click "Check" and follow the instruction.


S/W Management
A/C Compressor Test (ECV Type)
The inspection procedure for "Check" result from diagnosis test
ECV (External Control Valve)
1 ECV connector of compressor inspection
Check list
Check the connectors for looseness and pin status
Measure a resistance of ECV(10~11Ω)
Maintenance method : Replace ECV or Compressor
2 Refrigerant amount and filter inspection
Check list
Refer to the shop manual (Refrigerant amount)
Check the air conditioner filter
〈Contamination filter〉
〈Normal filter〉
Maintenance method : Check the refrigerant amount and Replace the filter of air conditioner
3 Condenser and cooling fan Inspection
Check list
Check the condenser for contamination
Operate the cooling fan
Maintenance method : Remove contamination on condenser and repair the component related cooling fan
Prev
Do not touch any system buttons while performing this function.

7. Inspect ECV again from the first step.

- Disassembly

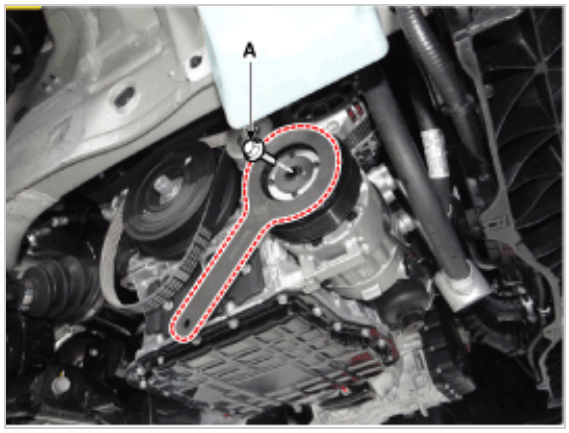
Information

- The images of vehicles and parts may differ from actual things.

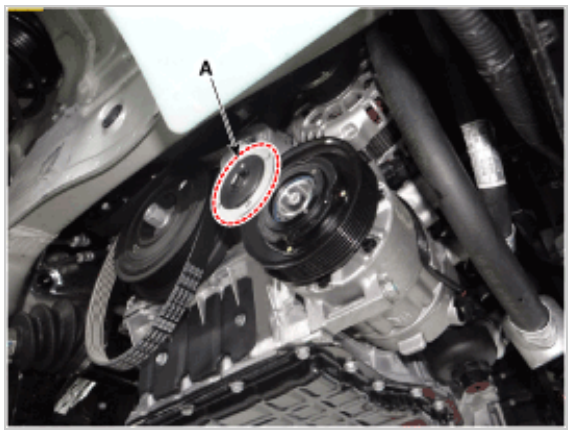
1. Remove the front tire [RH].

2. Loosen the drive belt.
   (Refer to Engine Mechanical System - "Drive Belt")
3. Remove the clutch bolt (A) while holding the pulley with a clutch bolt remover (09977-3R000).

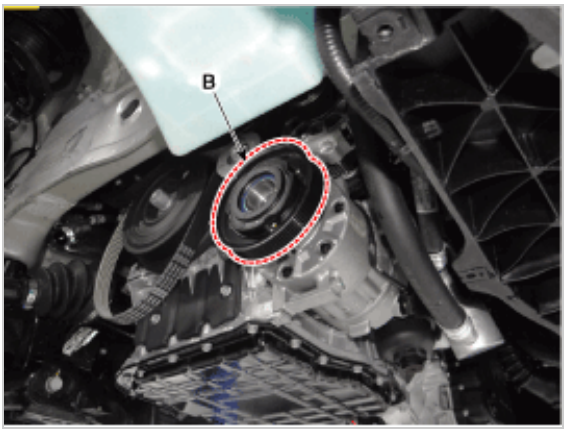
   Tightening torque :
   15.0 - 21.0 N.m (1.53 - 2.14 kgf.m , 11.1 - 15.5 lb - ft)



4. Loossen the limiter bolts and then remove the limiter & hub assembly.



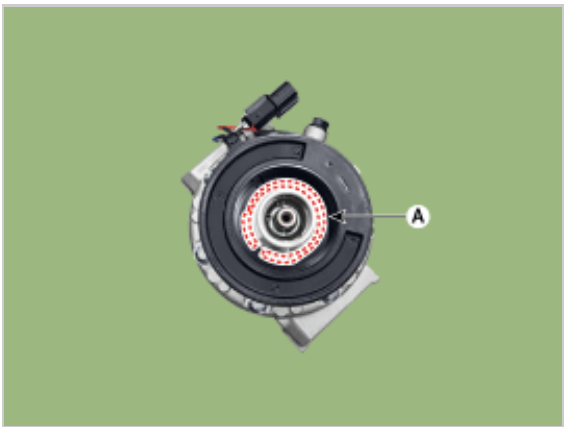
5. Remove the pulley (B) after removing the snap ring (A) with a snap ring plier.



NOTICE

- Be careful not to damage the pulley and compressor during disassembly/reassembly.
- Once the snap ring is removed, replace it with a new one.

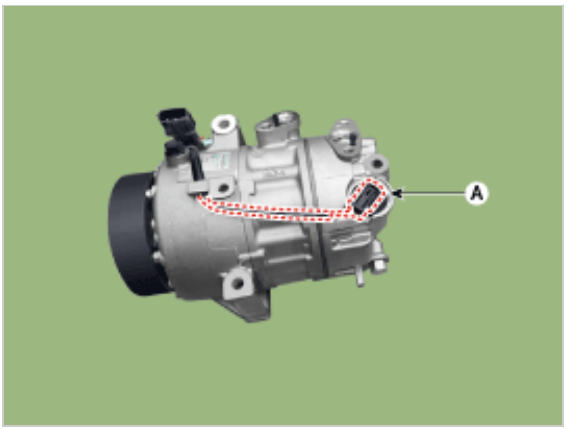
6. Remove the field coil snap ring (A).



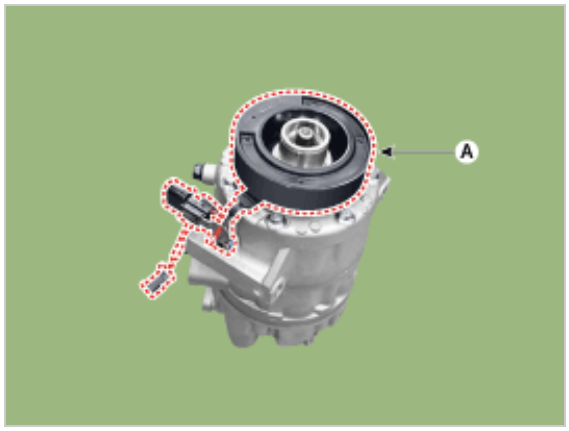
NOTICE

- Once the snap ring is removed, replace it with a new one.

7. Disconnect the ECV valve connector (A).



8. Remove the field coil assembly (A), after removing the screw.



NOTICE

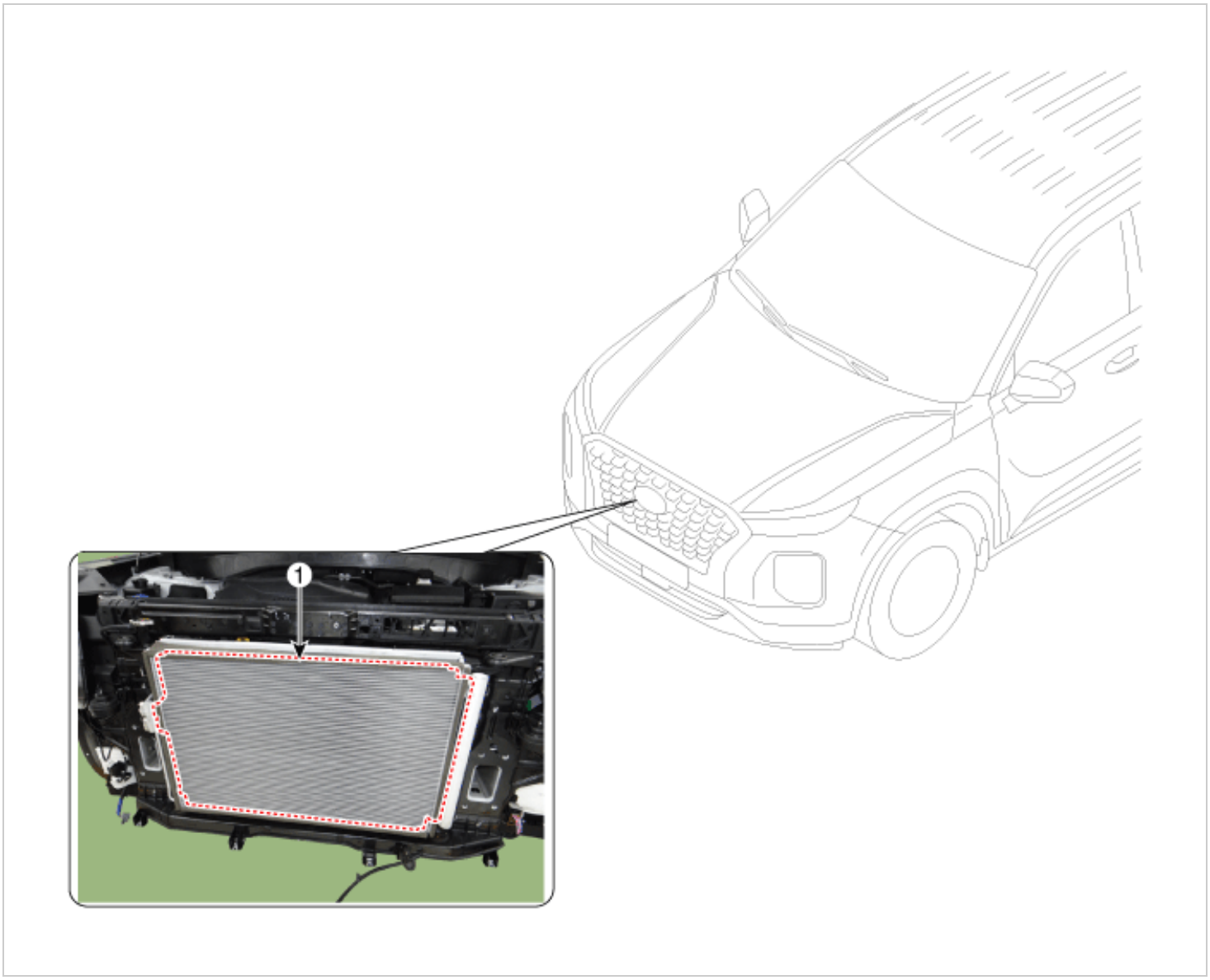
- Be careful not to damage the pulley and compressor during disassembly

9. Reassemble in the reverse order of disassembly.

NOTICE

- Clean the pulley and compressor sliding surfaces with non-petroleum solvent.
- Install a new snap ring, and make sure they are fully seated in the groove.
- Make sure that the pulley turns smoothly after reassembly.

- Components Location



1. Condensor

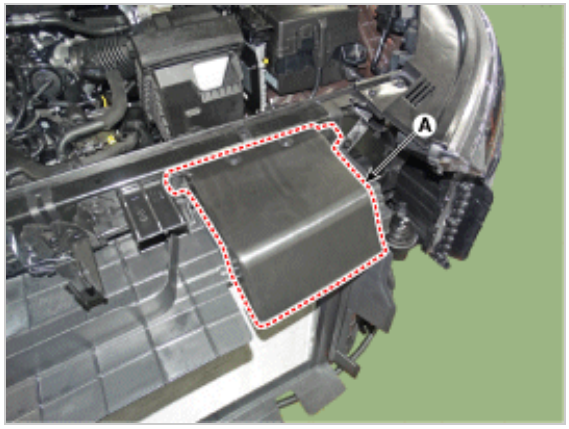
- Inspection

1. Check the condenser fins for clogging and damage. If clogged, clean them with water, and blow them with compressed air. If bent, gently bend them using a screwdriver or pliers.
2. Check the condenser connections for leakage, and repair or replace it, if required.

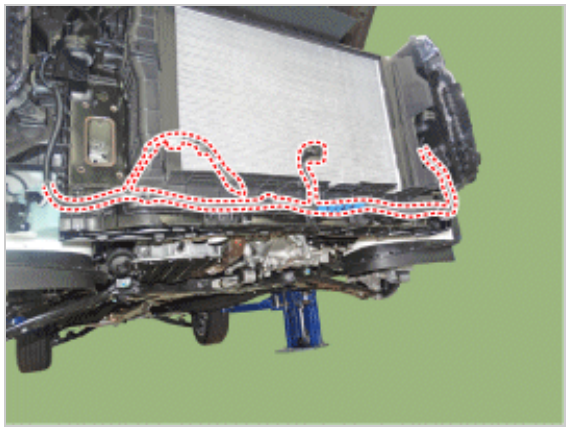
- Replacement

1. Recover the refrigerant with a recovery/recycling/charging station.
2. Disconnect the negative (-) battery terminal.
3. Remove the front bumper.
   (Refer to Body - "Front Bumper Cover")
4. Remove the front bumper beam assembly
   (Refer to Body - "Front bumper beam assembly")

5. Loosen the mounting clips and remove the intake shield (A).



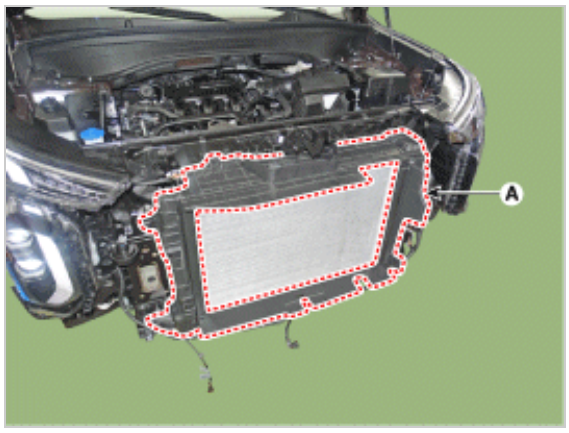
6. Separate the wiring connectors and harness clamps around the radiator air guard.



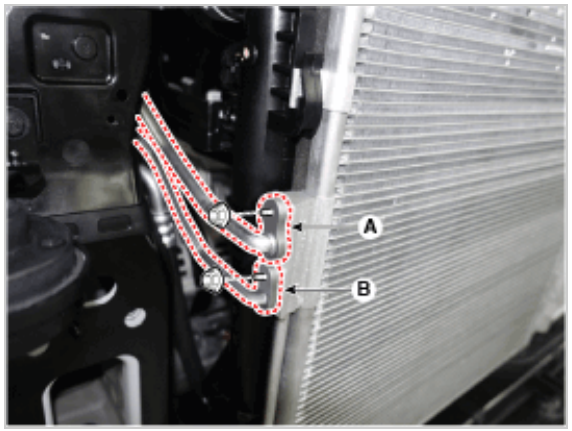
7. Remove the radiator air guard (A).

Tightening torque :

7.8 - 11.8 N.m (0.8 - 1.2 kgf.m, 5.8 - 8.7 lb-ft)



8. Loosen the mounting nuts and separate the discharge line (A) and liquid line (B).



9. Press the lock pin and remove the condenser assembly (A) from radiator assembly.

10. Install in the reverse order of removal.

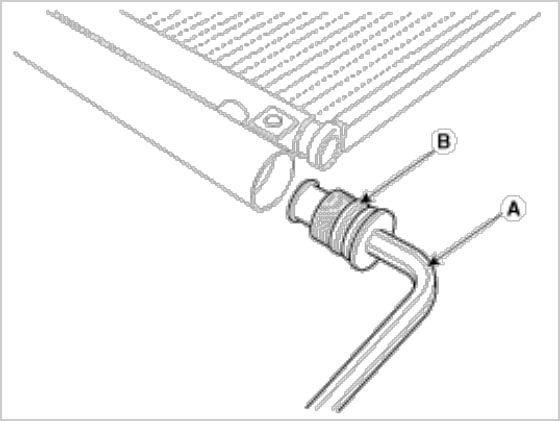
CAUTION

- If you're installing a new condenser, add refrigerant oil.
- Replace the O-rings with new ones at each fitting, and apply a thin coat of refrigerant oil before installing them. Be sure to use the right O-rings for R-1234yf to avoid leakage.
- Be careful not to damage the radiator and condenser fins when installing the condenser.
- Charge the system, and test its performance.

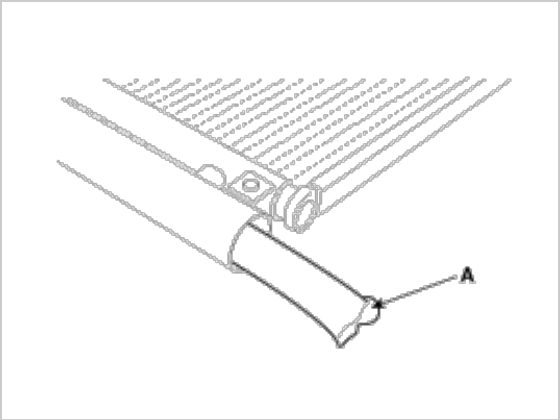
- Replacement

1. Remove the condenser.
   (Refer to A/C System - "Condenser")
2. Remove the cap (B) on the bottom of the condenser with an L wrench (A).

Tightening torque :
2.7 - 3.2 N.m (0.28 - 0.33 kgf.m, 2.0 - 2.4 lb-ft)



3. Remove the receiver-drier (A) from condenser using a long nose plier. Check for crumbled receiver-drier and clogged bottom cap filter.



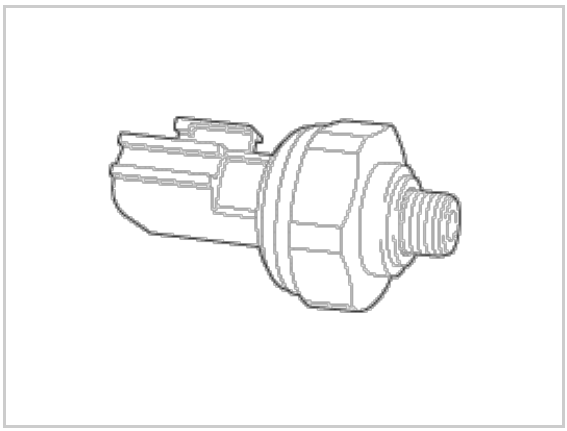
4. Install in the reverse order of removal.

NOTICE

- Always replace the receiver-drier and bottom cap at the same time.
- Replace the O-rings with new ones at each fitting, and apply a thin coat of refrigerant oil before installing them. Be sure to use the right O-rings for R-1234yf to avoid leakage.
- Be careful not to damage the radiator and condenser fins when installing the condenser.
- Charge the system, and test its performance.

- Description

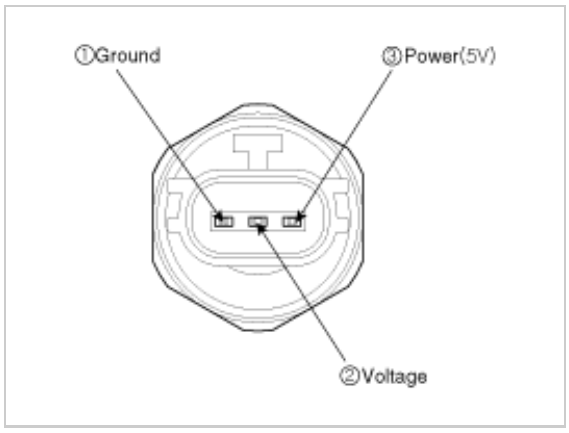
The A/C Pressure Transducer (APT) converts the pressure value of high pressure line into voltage value after measuring it. By converted voltage value, engine ECU controls the cooling fan by operating it high speed or low speed. Engine ECU stops the operation of the compressor when the temperature of refrigerant line is very high or very low irregularly to optimize air conditioning system.



Heating,Ventilation And Air Conditioning

- Inspection

1. Measure the pressure of high pressure line by measuring voltage output between terminal "1" and "2".



2. If the measured voltage value is not wihtin specification, replace the A/C pressure transducer.

Voltage =0.00878835 * Pressure + 0.4

- Replacement

1. Disconnect the negative (-) battery terminal.
2. Recover the refrigerant with a recovery/charging station.
3. Disconnect the A/C pressure transducer connector (A).

4. Remove the A/C pressure transducer (A).

Tightening torque :

10 - 12 N.m (1.02 - 1.22 kgf.m, 7.4 - 8.8 lb-ft)

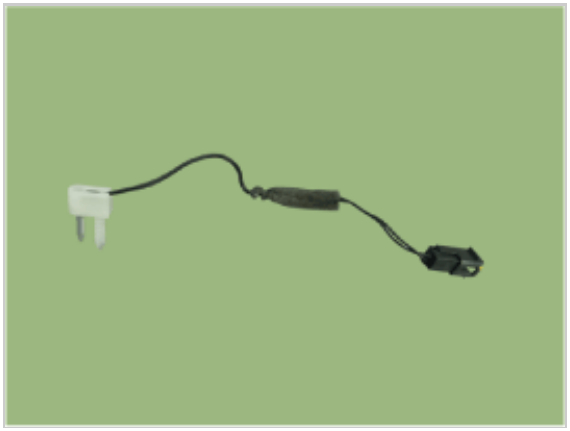
5. Install in the reverse order of removal.

⚠ CAUTION

- When installing, replace it with a new O-ring (A).

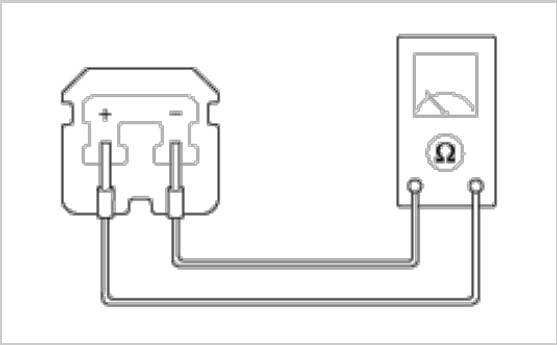
- Description

The evaporator temperature sensor will detect the evaporator core temperature and interrupt compressor relay power in order to prevent evaporator from freezing by excessive cooling.



- Inspection

1. Turn the ignition switch OFF.
2. Disconnect the evaporator temperature sensor connector.
3. Measure resistance between terminal "+" and "-" of the evaporator temperature sensor.



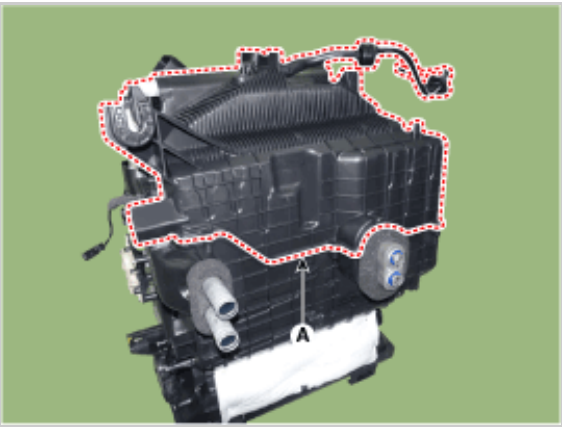
Specification

Evaporator core temperature [°C (°F)]	Resistance [KΩ]	Voltage [V]
-10 (14)	17.93	3.21
0 (32)	11.36	2.66
10 (50)	7.4	2.13
20 (68)	4.94	1.66
30 (86)	3.37	1.26
40 (104)	2.35	0.95

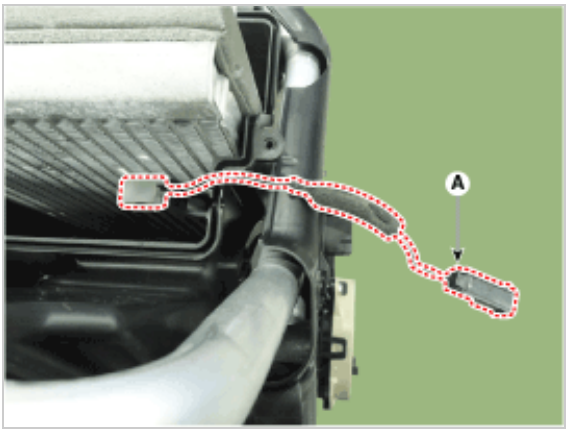
4. Connect the evaporator temperature sensor connector.
5. Run the engine and turn the A/C switch ON, then measure the voltage between the terminals of the harness connector.

- Replacement

1. Disconnect the negative (-) battery terminal.
2. Loosen the mounting screws and remove the evaporator core cover (A).



3. Separate the evaporator temperature sensor (A) from the evaporator core.



4. Install in the reverse order of removal.

Heating,Ventilation And Air Conditioning

- Description

The In-car air temperature sensor is built in the heater & A/C control unit.

The sensor consists of a thermistor that measures the inside temperature. The signal decided by the resistance value that changes in accordance with perceived inside temperature, is delivered to heater control unit, and according to this signal, the control unit regulates in-car temperature to intended value.

Heating,Ventilation And Air Conditioning

- Description

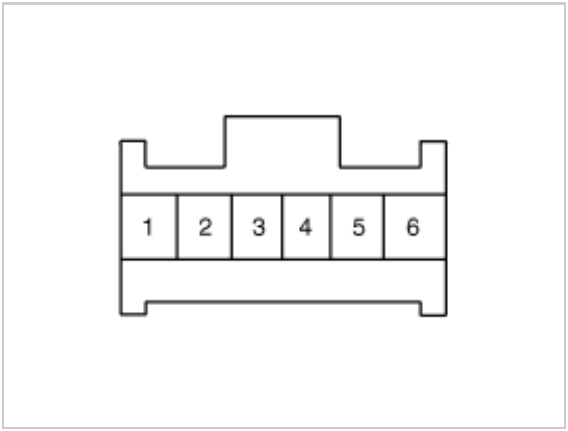
The photo sensor is located at the center of the defrost nozzles.

The photo sensor contains a photovoltaic (sensitive to sunlight) diode. The solar radiation received by its light receiving portion, generates an electromotive force in proportion to the amount of radiation received which is transferred to the automatic temperature control module so that the solar radiation compensation will be performed.

Heating,Ventilation And Air Conditioning

- Inspection

1. Emit intensive light toward the photo sensor using a lamp, and check the output voltage change.
2. The voltage will rise with higher intensive light and reduce with lower intensive light.



[Dual photo]

1. Auto light ground
2. Auto light power (+5V)
3. Auto light signal (OUT)
4. Photo sensor_DRV (OUT)

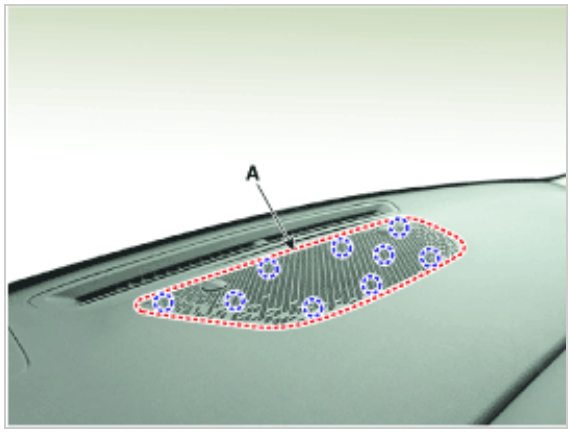
[Single photo]

1. Auto light ground
2. Auto light power (+5V)
3. Auto light signal (OUT)
4. Photo sensor signal (OUT)

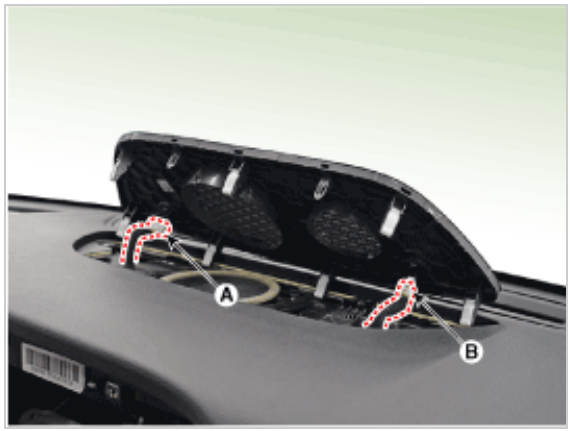
5. Photo sensor power (+5V)	5. Photo sensor power (+5V)
6. Photo sensor_Pass (OUT)	6. -

- Replacement

1. Disconnect the negative (-) battery terminal.
2. Using a remover and remove the center speaker grill (A).



3. Separate the photo sensor connector (A) and security sensor connector (B).



4. Remove the photo sensor (A).

5. Install in the reverse order of removal.

Information

- Make sure the hood latch release cable is connected properly.
- Replace any damaged clips (or retainers or fasteners).

- Description

The ambient temperature sensor is located at the front of the condenser and detects ambient air temperature. It is a negative type thermistor; resistance will increase with lower temperature, and decrease with higher temperature.

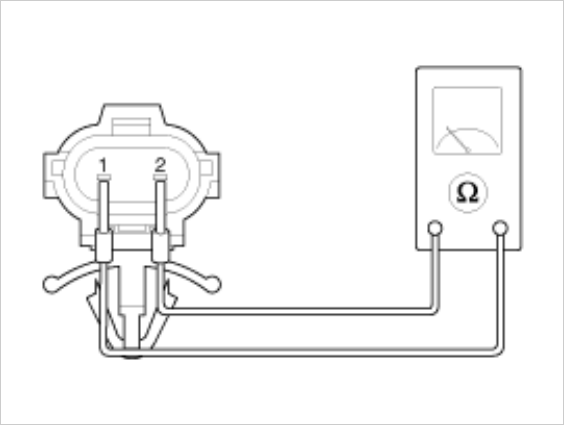
The sensor output will be used for discharge temperature control, temperature regulation door control, blower motor level control, mix mode control and in-car humidity control.

NOTICE

- If the ambient temperature is below 1.0°C (33.8°F), the A/C compressor will stop.
- The compressor will operate manually.

- Inspection

1. Check the resistance of the ambient temperature sensor between terminals 1 and 2 whether it changes by changing the ambient temperature.



1. Ambient Sensor (+)
2. Sensor ground

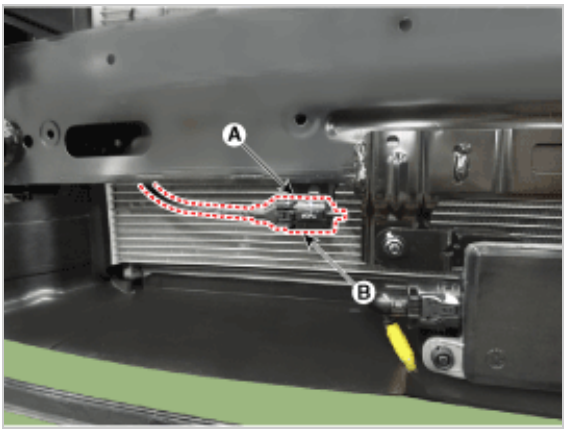
Specification

Ambient temperature [°C (°F)]	Resistance between terminals 1 and 2 (kΩ)
-30	507
-20	284.5
-10	164.2
0	97.5
10	59.6
20	37.46
30	24.18
40	16
50	10.83

2. If the measured resistance is not within specification, substitute with a known-good ambient temperature sensor and check for proper operation.
3. Replace the ambient temperature sensor if it is proved that there is a problem with the sensor.

- Replacement

1. Disconnect the negative (-) battery terminal.
2. Remove the front bumper.
   (Refer to Body - "Front Bumper Cover")
3. Disconnect the connector (A) and then remove the ambient temperature sensor (B).



4. Install in the reverse order of removal.

- Description

The auto defogging sensor is installed on the front window glass. The sensor judges and sends signal if moisture occurs to blow out wind for defogging. The air conditioner control module receives signal from the sensor and restrains moisture and eliminate defog by controlling the intake actuator, A/C, auto defogging actuator, blower motor rpm, and mode actuator.

- Inspection

To inspect and diagnose the sensor, refer to Self-Diagnosis procedure and DTC guide.

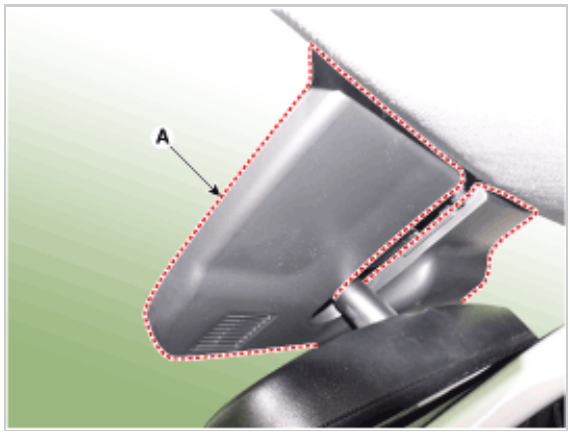
- Replacement

⚠ CAUTION

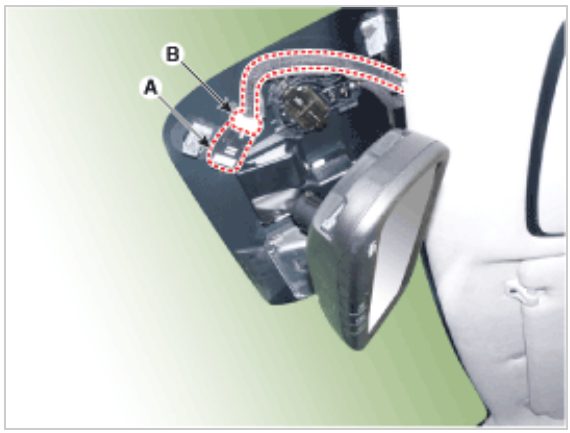
- When removing with a flat-tip screwdriver or remover, wrap protective tape around the tools to prevent damage to components.
- Put on gloves to prevent hand injuries.

1. Disconnect the negative (-) battery terminal.
2. Remove the rain sensor inner cover (A).

3. Remove the rain sensor cover (A).



4. Separate the auto defogging sensor connector (B) and remove the auto defogging sensor (A).



5. Install in the reverse order of removal.

Information

- Be careful to damage the windshield glass.
- Make sure the hood latch release cable is connected properly.

- Description

The cluster ionizer makes disinfection and decomposition of bad smell from the air-conditioner or inflow air. And it cleans the inside air of a vehicle.

When the ignition switch is ON, the ionizer runs "CLEAN" mode and then "ION" mode, switching between both modes.

In the "CLEAN" mode, the cluster ionizer generates negative ions and positive ions to help clean smells from the air.

In the "ION" mode, the cluster ionizer generates negative ions and cleans inside air of a vehicle.

- Inspection

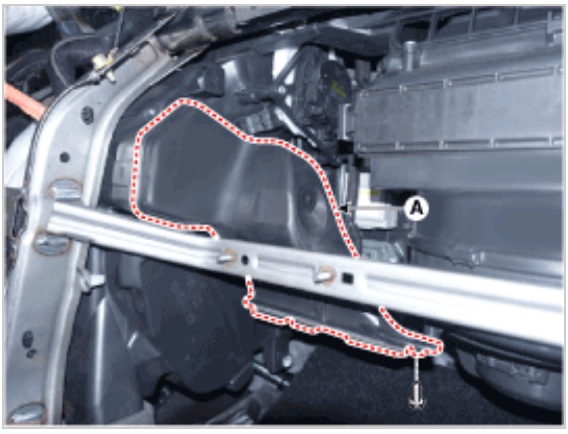
1. Press the MODE switch more then 4 times within 2 seconds while pressing the OFF switch.

Display	Fail description
00	Normal
44	Cluster ion generator fault

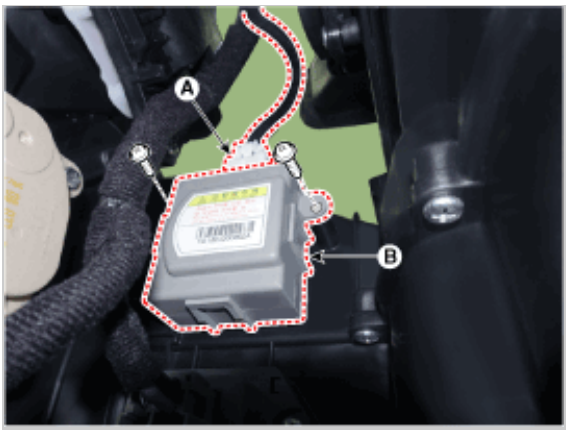
* For diagnostic procedure, refer to DTC guide.

- Replacement

1. Disconnect the negative (-) battery terminal.
2. Remove the crash pad center panel.
   (Refer to Body - "Crash Pad Center Panel")
3. Loosen the mounting screws and remove the passenger shower duct (A).

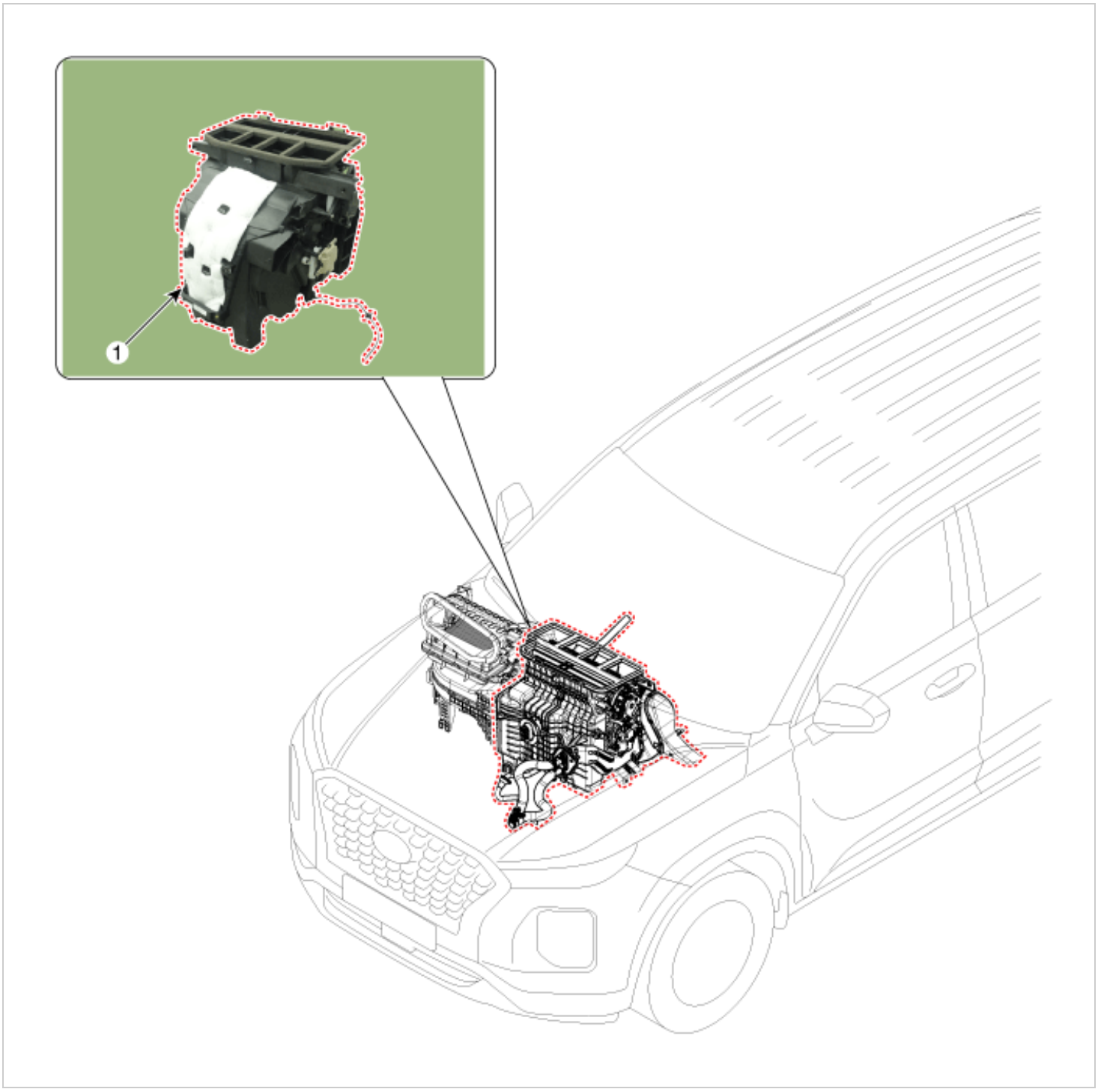


4. Separate the cluster ionizer connector (A).
5. Loosen the mounting screws and remove the cluster ionizer (B).



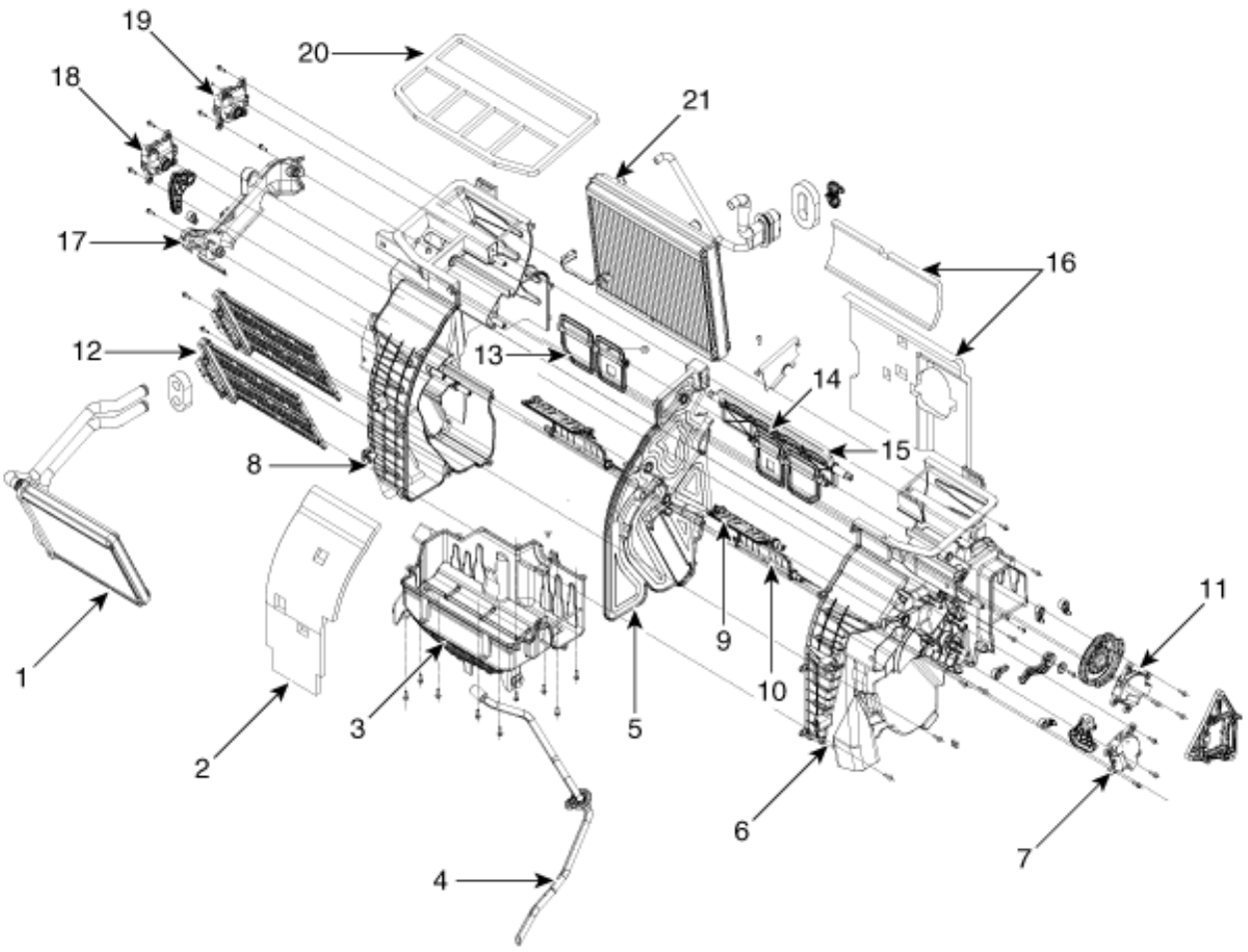
6. Install in the reverse order of removal.

- Component Location



1. Heater unit assembly

- Components



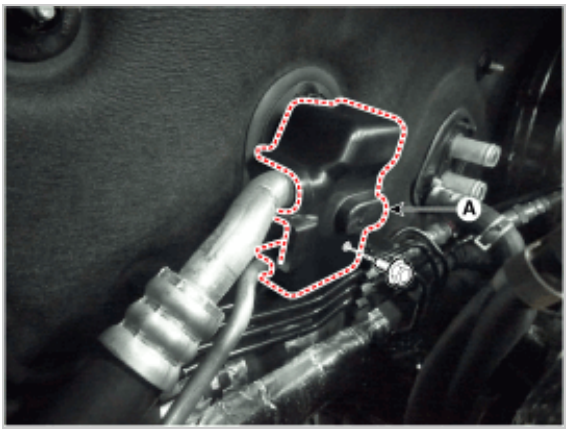
1. Heater core assembly
2. Heater unit pad
3. Heater lower cover
4. Drain hose
5. Heater blind case
6. Heater case [RH]
7. Temperature actuator [RH]
8. Heater case [LH]
9. FOOT Door assembly
10. Temperature door assembly
11. Mode actuator
12. PTC Heater
13. Vent door assembly [LH]
14. Vent door assembly [RH]
15. DEF Door assembly
16. Heater unit pad
17. Heater pipe cover
18. Temperature actuator [LH]
19. Duct seal assembly
21. Evaporator assembly

- Replacement

1. Disconnect the negative (-) battery terminal.
2. Recover the refrigerant with a recovery/recycling/charging station.
3. When the engine is cool, drain the engine coolant from the radiator.
   (Refer to Engine Mechanical System - "Coolant")
4. Remove the cowl top cover.
   (Refer to Body - "Cowl Top Cover")
5. Loosen the mounting nut and remove the expension valve cover (A).

Tightening torque :

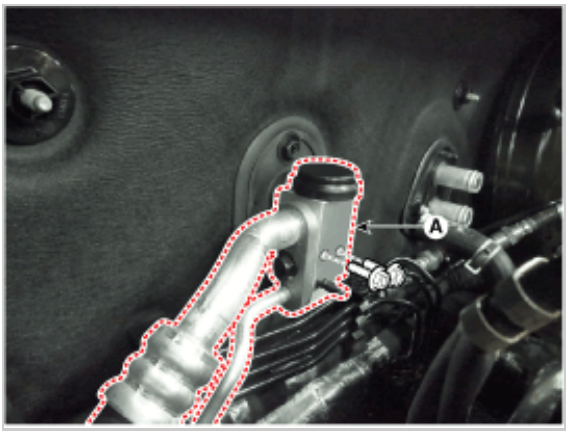
8.8 - 13.7 N.m (0.9 - 1.4 kgf.m , 6.5 - 10.1 lb-ft)



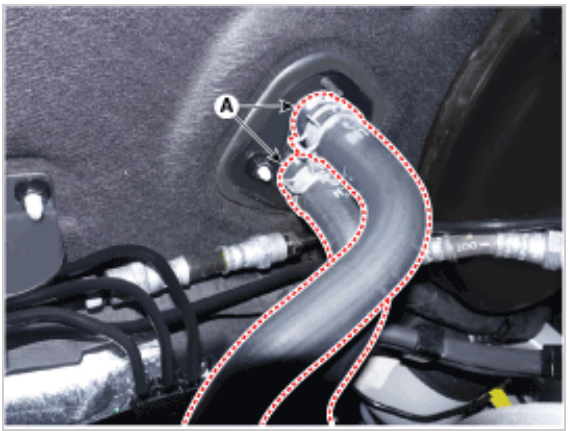
6. Loosen the mounting bolts and separate the expension valve (A) from the evaporator core.

Tightening torque :

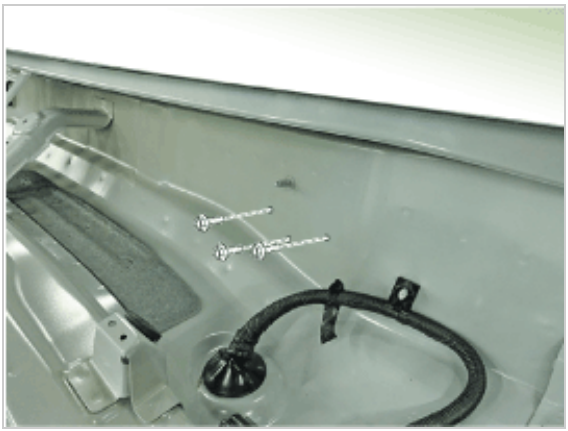
8.8 - 13.7 N.m (0.9 - 1.4 kgf.m , 6.5 - 10.1 lb-ft)



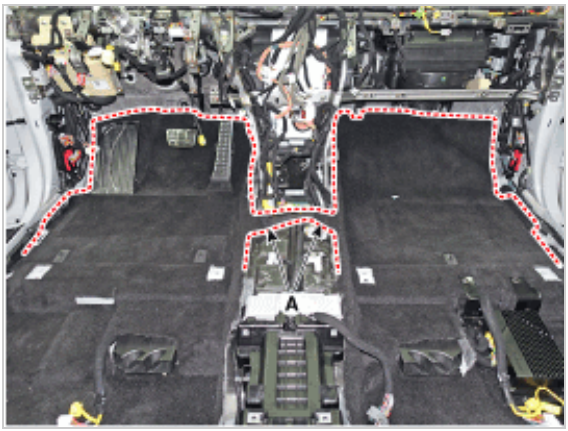
7. Separate the heater hose (A).



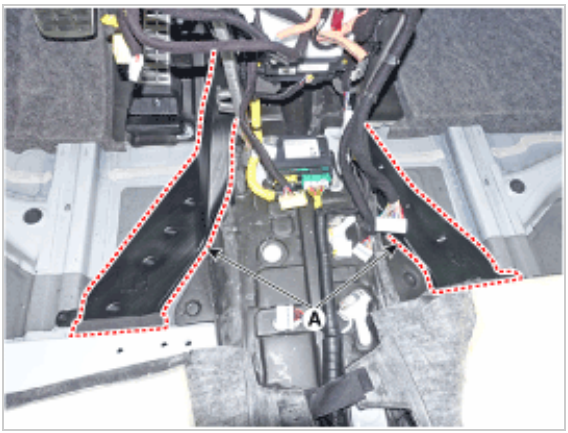
8. Loosen the cowl cross bar assembly mounting bolts.



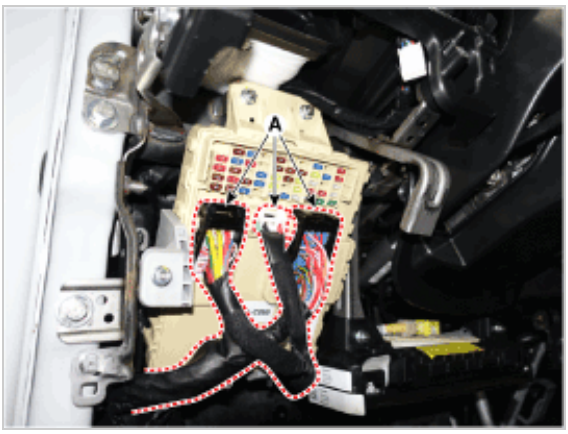
9. Remove the front seat assembly.
   (Refer to Body - "Front Seat Assembly")
10. Remove the floor console assembly.
    (Refer to Body - "Floor Console Assembly")
11. Remove the front pillar trim.
    (Refer to Body - "Front Pillar Trim")
12. Remove the cowl side trim.
    (Refer to Body - "Cowl Side Trim")
13. Remove the crash pad lower panel.
    (Refer to Body - "Crash Pad Lower Panel")
14. Remove the crash pad center panel.
    (Refer to Body - "Crash Pad Cener Panel")
15. Remove the steering column shroud lower panel.
    (Refer to Body - "Steering Column Shroud Panel")
16. Remove the steering wheel.
    (Refer to Steering System - "Steering Wheel")
17. Remove the multifunction switch.
    (Refer to Body Electrical System - "Multifunction Switch")
18. Lower the steering column after loosening the mounting bolts.
    (Refer to Steering System - "Steering Column and Shaft")
19. Remove the front door scuff trim.
    (Refer to Body - "Door Scuff Trim")
20. Remove the shift lever assembly.
    (Refer to Automatic Transaxle System - "Shift Lever")
21. Remove the accelerator pedal.
    (Refer to Engine Control/Fuel System - "Accelerator Pedal")
22. Separate the floor carpet (A) to obtain space for removing the rear heating duct.



23. Loosen the mounting nuts and remove the rear heating duct (A).

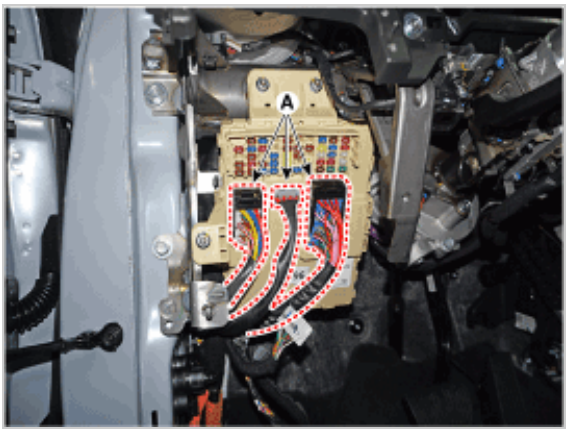


24. Disconnect the junction box connectors (A).

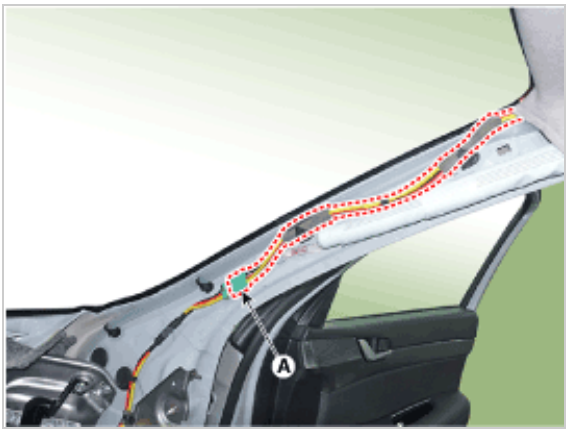


25. Disconnect the multi box connectors (A).

[LH]

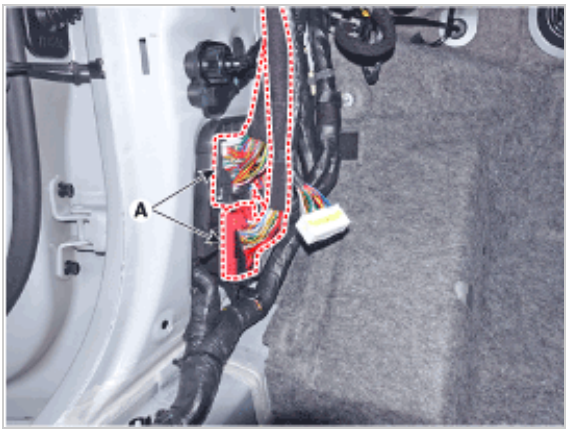


[RH]

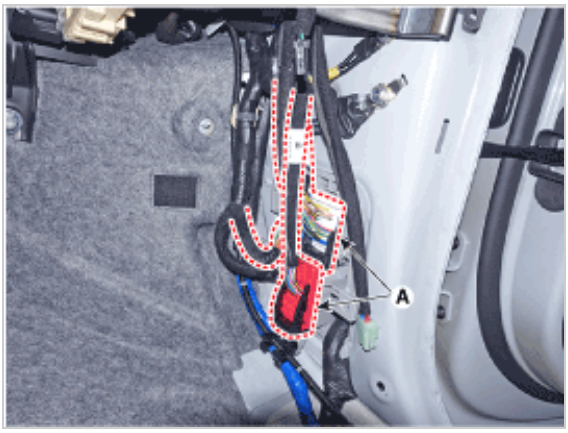


26. Disconnect the multi box connectors (A).

[LH]



[RH]



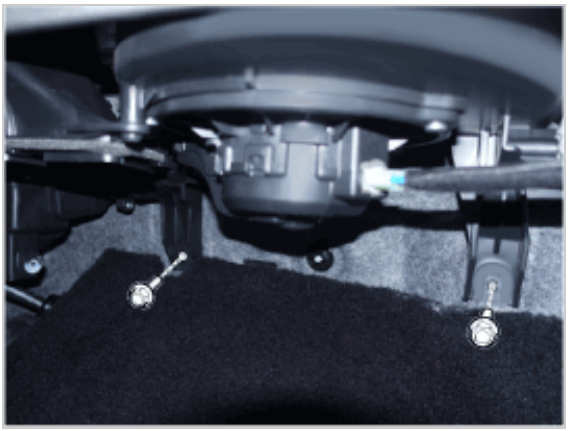
27. Remove the drain hose (A).

28. Remove the lower mounting bolt of the blower unit.

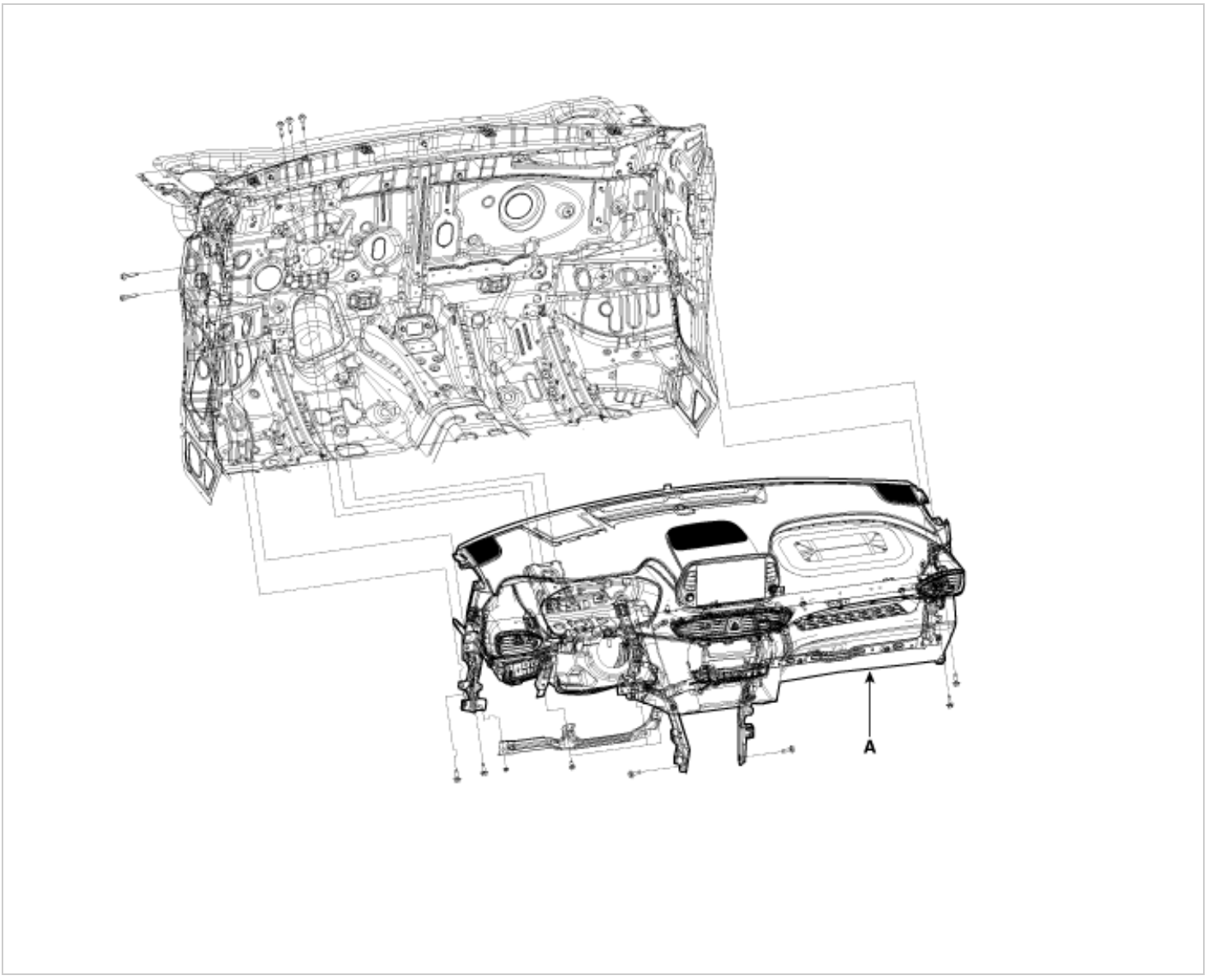
Tightening torque :
3.9 - 5.9 N.m (0.4 - 0.6 kgf.m , 2.9 - 4.3 lb-ft)

[LH]

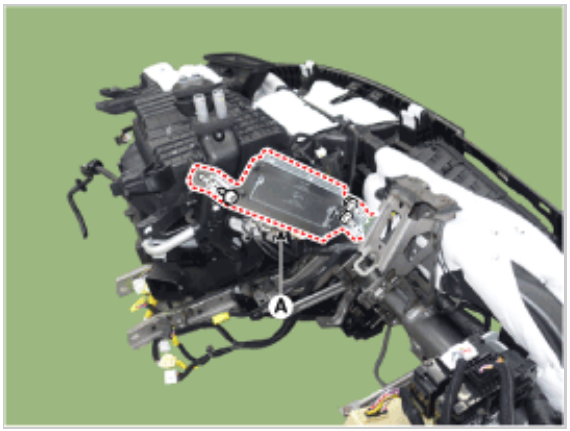
[RH]



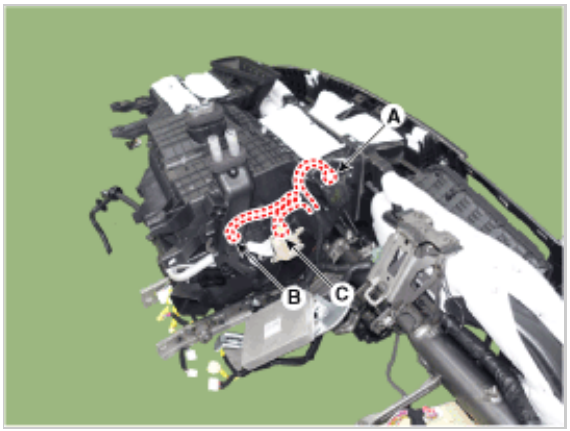
29. After loosening the bolts and nuts remove the crash pad and heater & blower unit assembly (A) together.



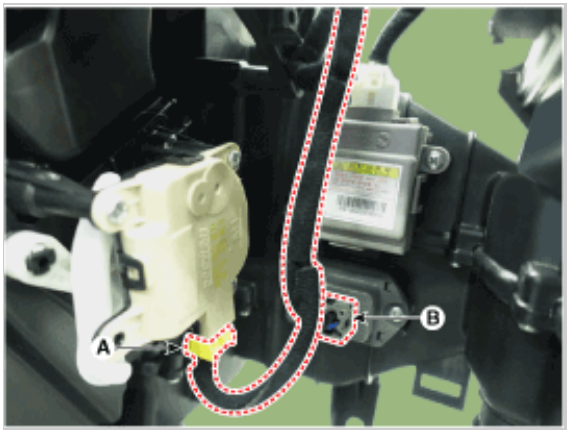
30. Disconnect the heater & blower unit connectors.
    (1) Loosen the mounting nuts, screws and remove the Surround view monitoring (SVM) unit (A).



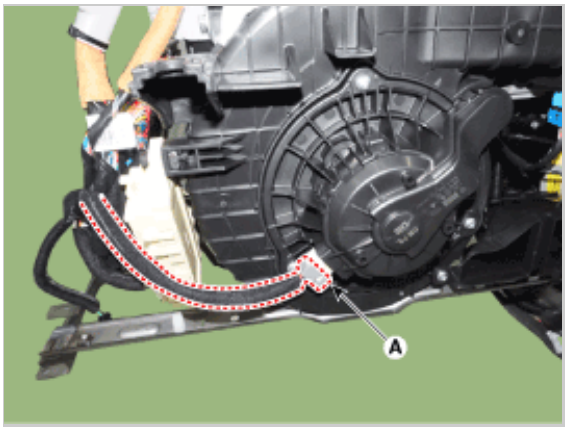
(2) Separate the auto defoging actuator connector(A), evaporator sensor connector(B), temperature control actuator connector (C).



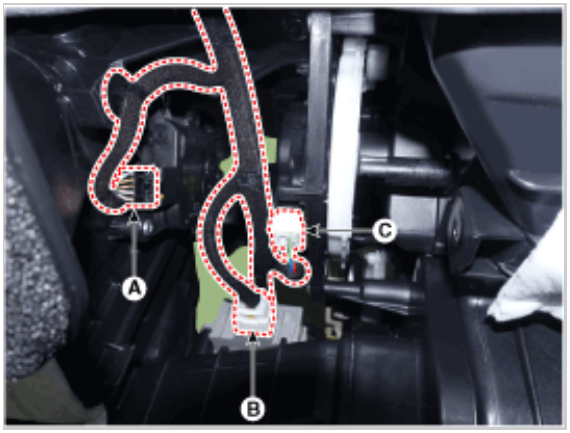
(3) Separate the temperature control actuator [RH] connector (A), power mosfet connector (B).



(4) Separate the blower motor connector (A) and loosen the mounting clip.

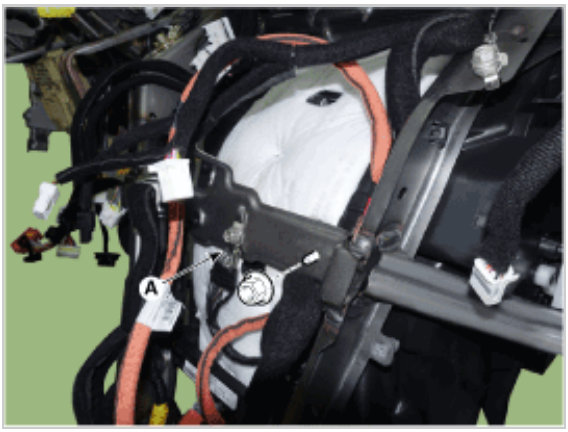


(5) Separate the intake actuator connector (A) , cluster ionizer connector (B) , mode actuator connector (C).



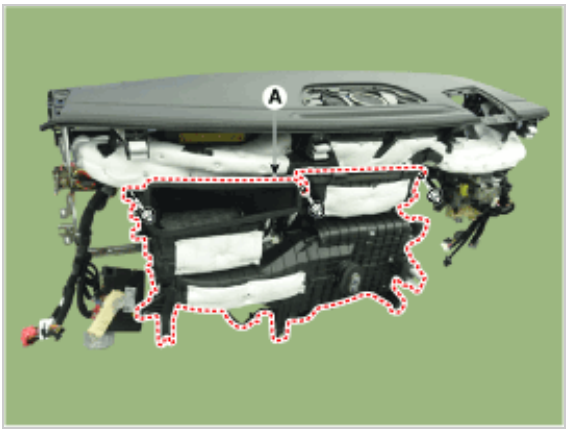
31. Loosen the heater & blower unit mounting bolt (A).

Tightening torque :
3.9 - 5.9 N.m (0.4 - 0.6 kgf.m , 2.9 - 4.3 lb-ft)



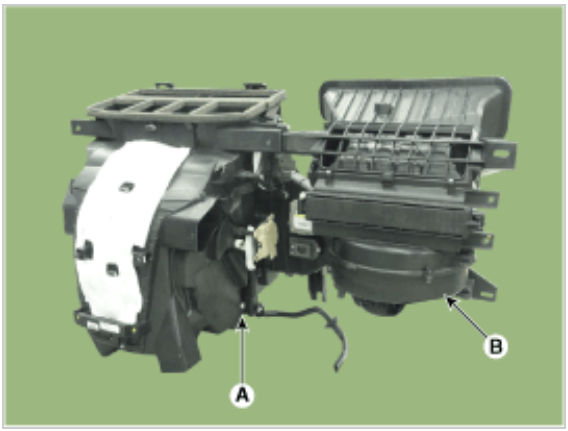
32. Loosen the mounting nuts and remove the heater & blower unit (A) from the crash pad.

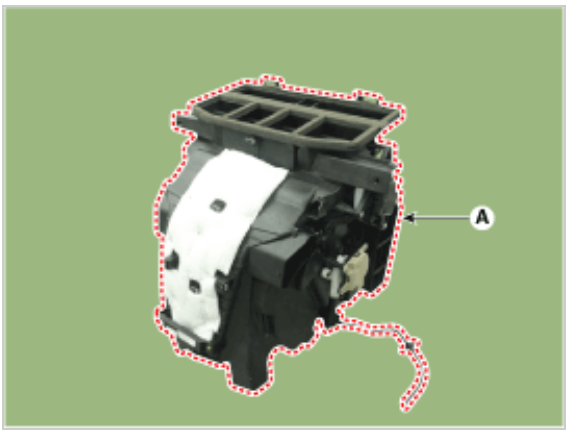
Tightening torque :
3.9 - 5.9 N.m (0.4 - 0.6 kgf.m , 2.9 - 4.3 lb-ft)



33. Loosen the mounting screw and separate the heater unit (A) from the blower unit (B).

Tightening torque :
3.9 - 5.9 N.m (0.4 - 0.6 kgf.m , 2.9 - 4.3 lb-ft)



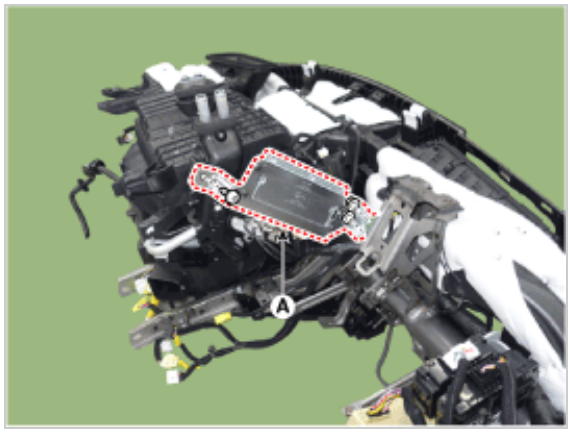


34. Install in the reverse order of removal.

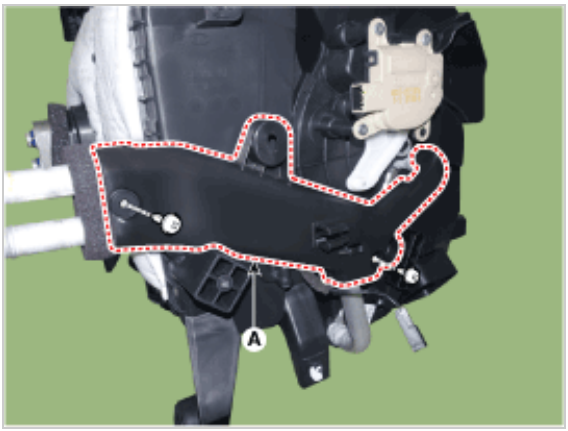
> **Information**
> - Replace any damaged clips (or retainers or fasteners).
> - Make sure the hood latch release cable is connected properly.

- Replacement

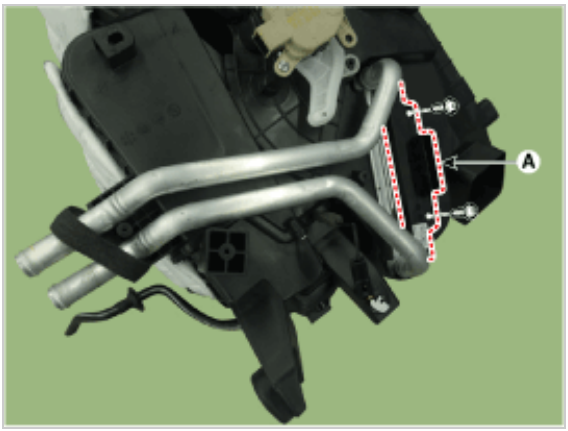
1. Disconnect the negative (-) battery terminal.
2. Remove the heater and blower assembly.
   (Refer to Heater - "Heater Unit")
3. Loosen the mounting nuts, screws and remove the Surround view monitoring (SVM) unit (A).



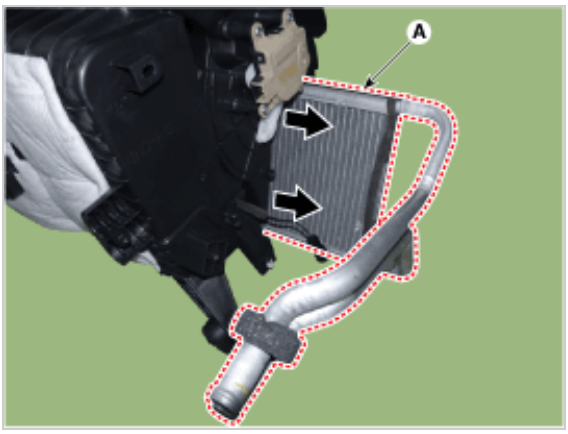
4. Loosen the mounting screws and remove the heater core cover (A).



5. Loosen the mounting screws and remove the PTC heater (A).



6. Separate the heater core (A) from the heater unit.



7. Install in the reverse order of removal.

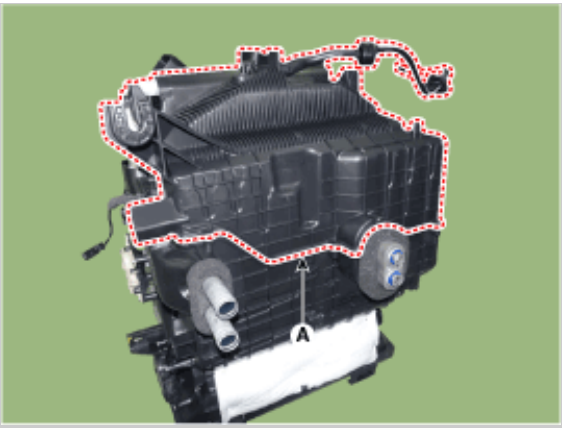
Information

- If you're installing a new heater core, add refrigerant oil (PAG OIL).
- Replace the O-rings with new ones at each fitting, and apply a thin coat of refrigerant oil before installing them. Be sure to use the right O-rings for R-1234yf to avoid leakage.
- Immediately after using the oil, replace the cap on the container, and seal it to avoid moisture absorption.
- Do not spill the refrigerant oil on the vehicle; it may damage the paint; if the refrigerant oil contacts the paint, wash it off immediately.
- Apply sealant to the grommets.
- Make sure that there is no air leakage.
- Charge the system and test its performance.

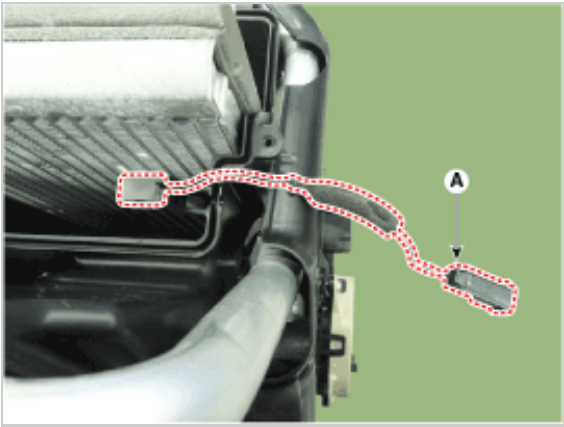
- Do not interchange the inlet and outlet heater hoses and install the hose clamps securely.
- Refill the cooling system with engine coolant.

- Replacement

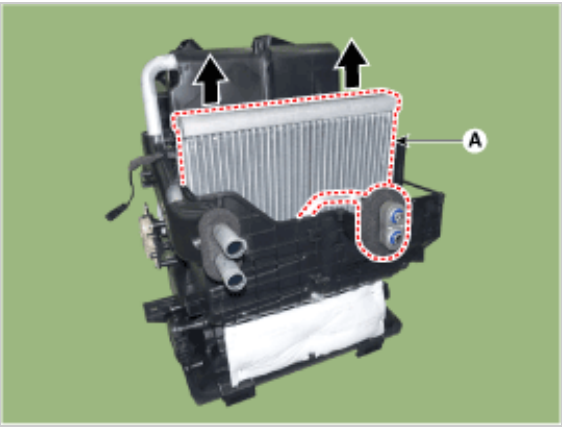
1. Disconnect the negative (-) battery terminal.
2. Remove the heater and blower assembly.
   (Refer to Heater - "Heater Unit")
3. Remove the heater core.
   (Refer to Heater - "Heater Core")
4. Loosen the mounting screws and remove the evaporator core cover (A).



5. Separate the evaporator temperature sensor (A) from the evaporator core.



6. Remove the evaporator core (A) from the heater unit.



7. Install in the reverse order of removal.

CAUTION

- Be careful that the inlet and outlet pipe are not bent during heater core and evaporator core removal/installation.

Information

- If you're installing a new evaporator core, add refrigerant oil (PAG OIL).
- Replace the O-rings with new ones at each fitting, and apply a thin coat of refrigerant oil before installing them. Be sure to use the right O-rings for R-1234yf to avoid leakage.
- Immediately after using the oil, replace the cap on the container, and seal it to avoid moisture absorption.
- Do not spill the refrigerant oil on the vehicle; it may damage the paint; if the refrigerant oil contacts the paint, wash it off immediately.
- Make sure that there is no air leakage.
- Charge the system and test its performance.
- Do not interchange the inlet and outlet heater hoses and install the hose clamps securely.
- Refill the cooling system with engine coolant.

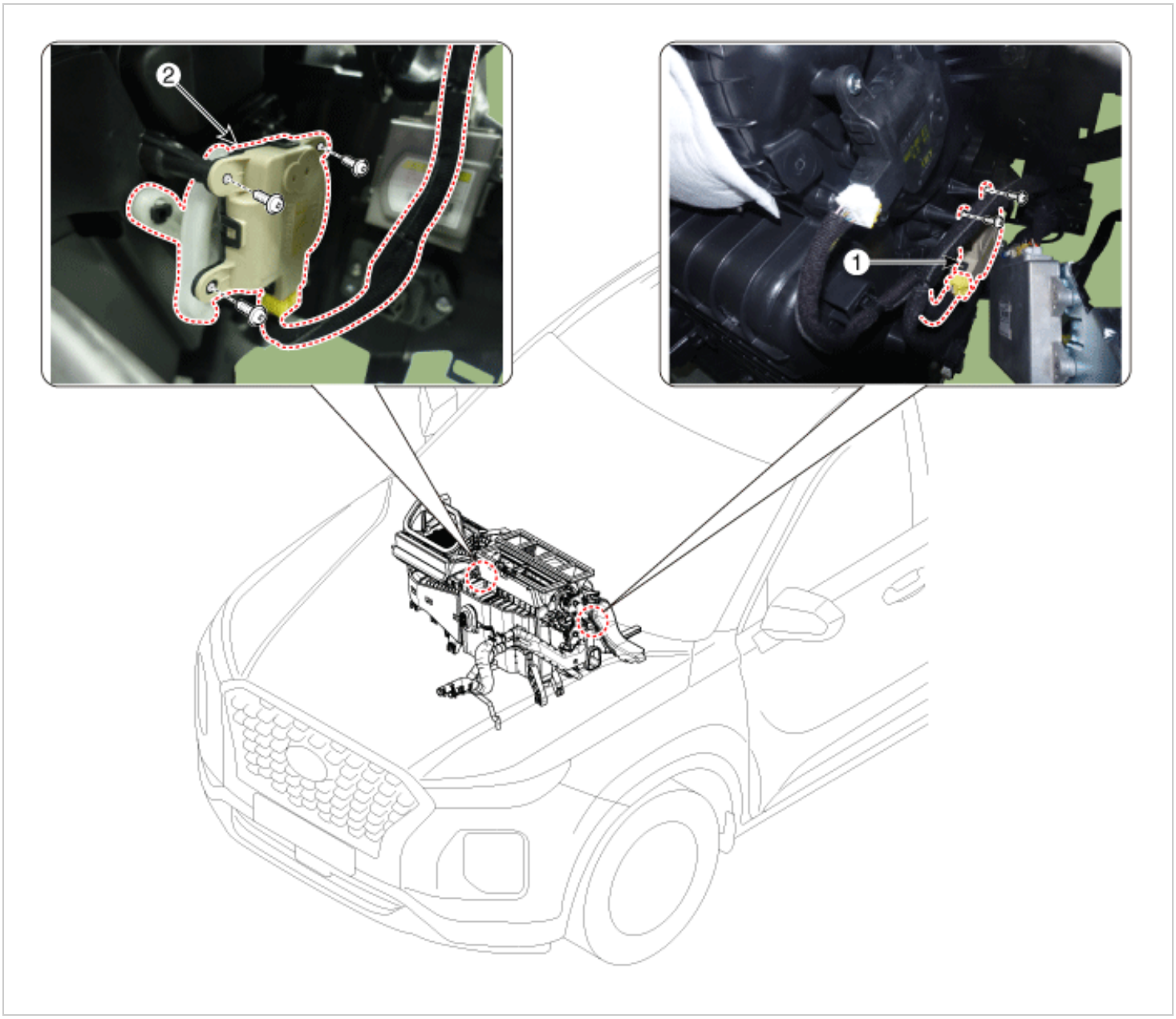
- Description

The heater unit includes mode control actuator and temperature control actuator.

The temperature control actuator is located at the heater unit. It regulates the temperature by the procedure as follows.

Signal from control unit adjusts the position of the temperature door by operating the temperature switch. Then the temperature will be regulated by the hot/cold air ratio decided by the position of the temperature door.

- Component Location

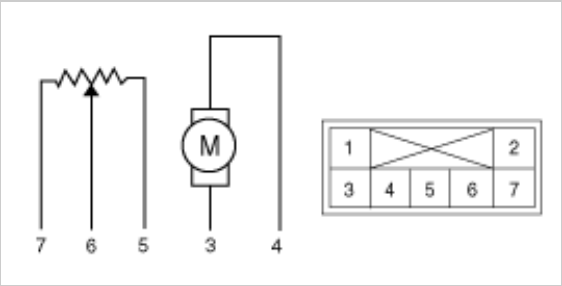


1. Temperature control actuator [LH]
2. Temperature control actuator [RH]

- Inspection

1. Turn the ignition switch OFF.
2. Disconnect the temperature control actuator connector.
3. Verify that the temperature control actuator operates to the cool position when connecting 12V to terminal 3 and grounding terminal 4. Verify that the temperature control actuator operates to the warm position when connected in reverse.

[Driver]



1. -
2. -
3. Coll position
4. Warm position
5. Sensor ground
6. Feedback signal
7. Sensor power (+5V)

[Passenger]

1. -
2. -
3. Coll position
4. Warm position
5. Sensor power (+5V)
6. Feedback signal
7. Sensor ground

4. Connect the temperature control actuator connector.
5. Turn the ignition switch ON.
6. Check the voltage between terminal 5 and 6.
   Specification

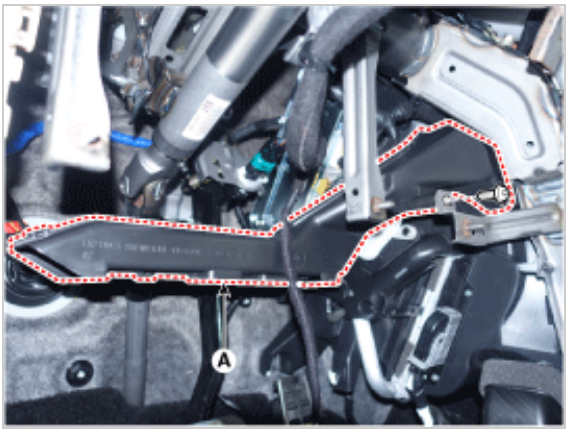
Door Position	Voltage (V)	Error Detecting
Max. cooling	0.3 ± 0.15	Low voltage : 0.1V or less
Max. heating	4.5 ± 0.15	High voltage : 4.9V or less

   It will feedback the current position of the actuator to controls.
7. If the measured voltage is not within specification, substitute with a known-good temperature control actuator and check for proper operation.
8. Replace the temperature control actuator if it is proved that there is a problem with it.

- Replacement

[LH, Driver]

1. Disconnect the negative (-) battery terminal.
2. Remove the crash pad lower panel.
   (Refer to Body - "Crash Pad Lower Panel")
3. Loosen the mounting screws and remove the shower duct [LH] (A).

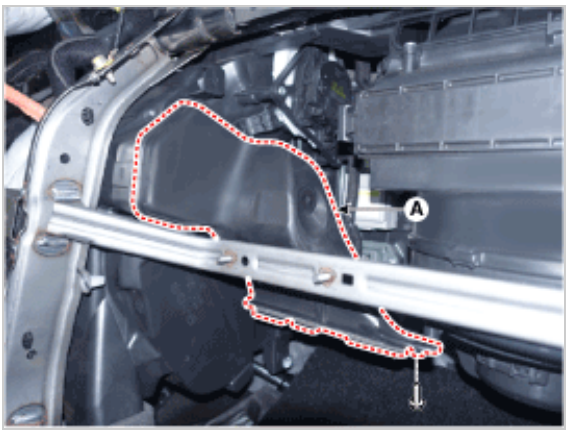


4. Separate the Surround view monitoring (SVM) unit.
   (Refer to Body Electrical System - "SVM Unit")
5. Separate the temperature control actuator connector (A) and loosen the mounting screw and remove the temperature control actuator (B).

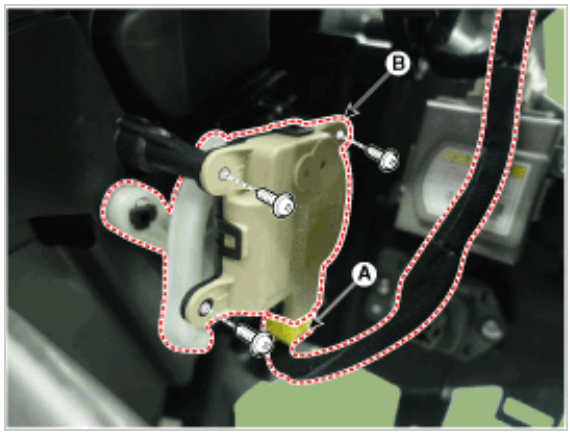
6. Install in the reverse order of removal.

[RH, Passenger]

1. Disconnect the negative (-) battery terminal.
2. Remove the crash pad center panel.
   (Refer to Body - "Crash Pad Center Panel")
3. Loosen the mounting screws and remove the shower duct [RH] (A).



4. Separate the temperature control actuator connector (A) and loosen the mounting screw and remove the temperature control actuator (B).



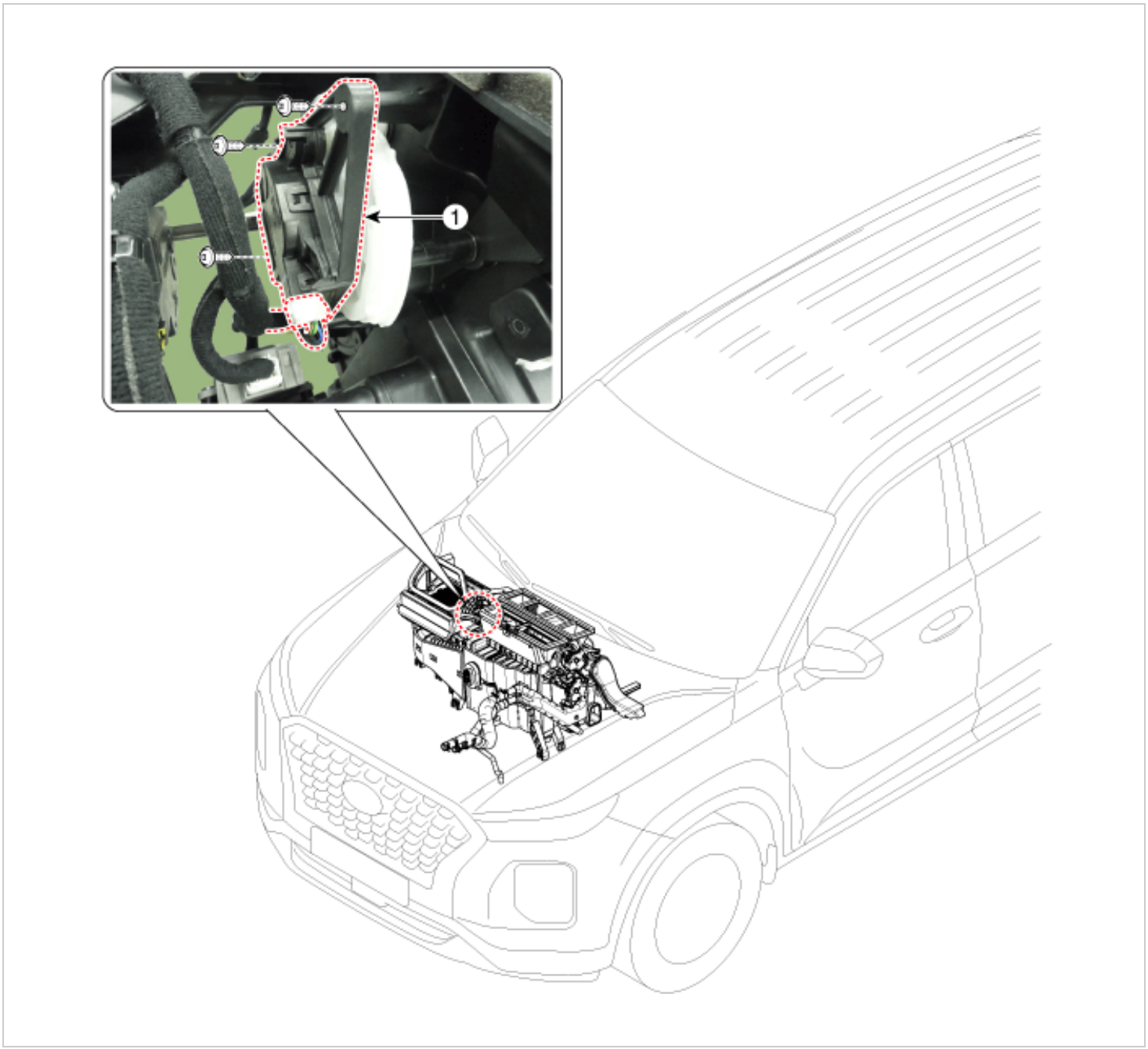
5. Install in the reverse order of removal.

- Description

The mode control actuator is located at the heater unit.

It adjusts the position of the mode door by operating the mode control actuator based on the signal of the A/C control unit. Pressing the mode select switch makes the mode control actuator shift in order of Vent → Bi-Level → Floor → Mix.

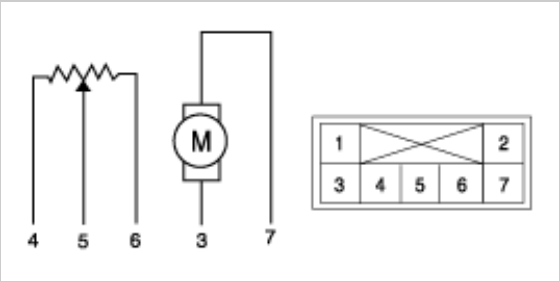
- Components Location



1. Mode control actuator

- Inspection

1. Turn the ignition switch OFF.
2. Disconnect the mode control actuator connector.
3. Verify that the mode control actuator operates to the defrost mode when connecting 12V to terminal 3 and grounding terminal 4. Verify that the mode control actuator operates to the vent mode when connected in reverse.



1. -
2. -
3. Vent mode
4. Defrost mode
5. Sensor power (+5V)
6. Feedback signal
7. Sensor ground

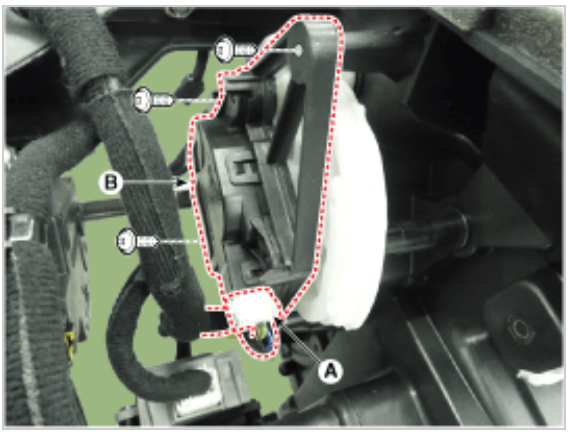
4. Connect the mode control actuator connector.
5. Turn the ignition switch ON.
6. Check the voltage between terminal 5 and 4.
   Specification

Door position	Voltage (V)	Error detecting
Vent	0.5 ± 0.15V	Low voltage : 0.1V or less High voltage : 5.0V or less
Defrost	4.5 ± 0.15V	

   It will feedback the current position of the actuator to controls.
7. If the measured voltage is not within specification, substitute with a known-good mode control actuator and check for proper operation.
8. Replace the mode control actuator if it is proved that there is a problem with it.

- Replacement

1. Disconnect the negative (-) battery terminal.
2. Remove the main crash pad assembly.
   (Refer to Body - "Main Crash Pad Assembly")
3. Separate the mode control actuator connector (B) and loosen the mounting screw and remove the mode control actuator (A).

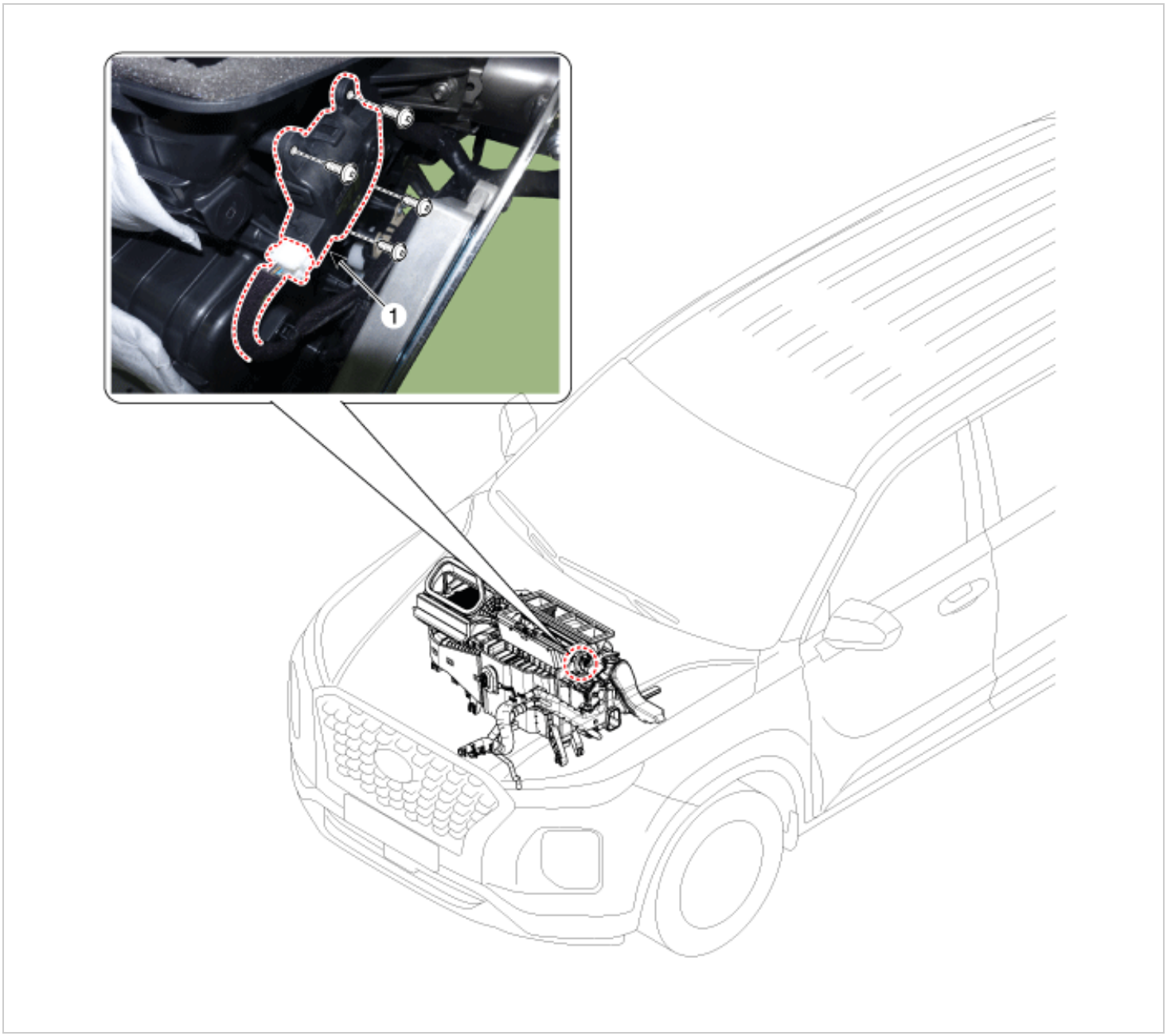


4. Install in the reverse order of removal.

- Description

The auto defogging sensor is installed on the front window glass. The sensor judges and sends signal if moisture occurs to blow out wind for defogging. The air conditioner control module receives a signal from the sensor and restrains moisture and eliminates defog by the intake actuator, A/C, auto defogging actuator, blower motor rpm and mode actuator.

- Components Location

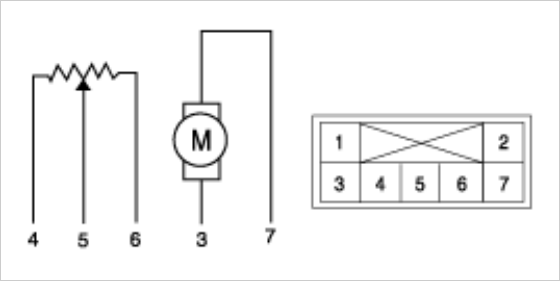


1. Auto defogging actuator

- Inspection

1. Turn the ignition switch OFF.
2. Disconnect the auto defogging connector.
3. Verify that the auto defogging actuator operates to the open position when connecting 12V to terminal 3 and grounding terminal 6.

Verify that the auto defogging actuator operates to the close position when connected in reverse.



1. -
2. -
3. DEF (Close)
4. DEF (Open)
5. Sensor power (+5V)
6. Feedback signal
7. Sensor ground

4. Connect the auto defogging actuator connector.
5. Turn the ignition switch ON.
6. Check the voltage between terminals 5 and 4.

> **NOTICE**
> • It will feedback the current position of the actuator to controls.

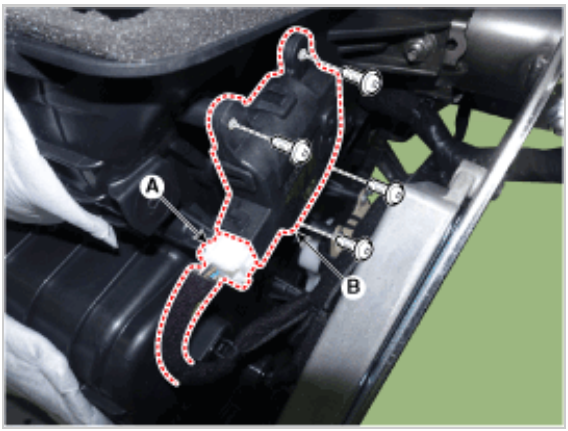
Specification

Door position	Voltage (V)	Error detecting
Defog ON (Open)	0.5 ± 0.15	Low voltage : 0.7V or less
Defog OFF (Close)	4.7 ± 0.15	High voltage : 4.9V or less

7. If the measured voltage is not within specification, check the operation by replacing the existing auto defogging actuator with a new genuine part. After that, determine whether replacement of the auto defogging actuator is required or not.

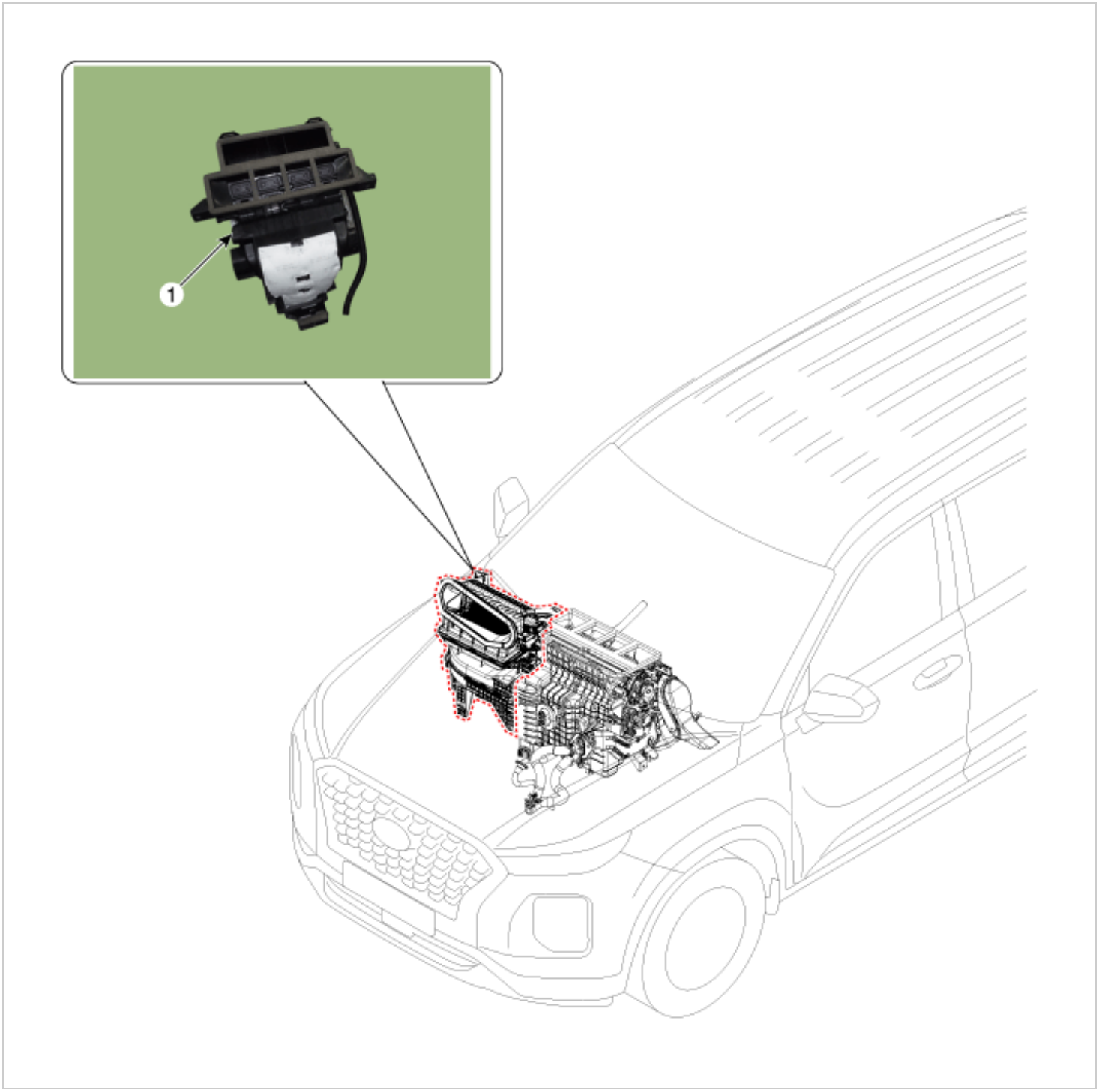
- Replacement

1. Disconnect the negative (-) battery terminal.
2. Remove the main crash pad assembly.
   (Refer to Body - "Main Crash Pad Assembly")
3. Press the lock pin and separate the connector (A) and loosen the mounting screws and remove the auto defogging actuator (B).



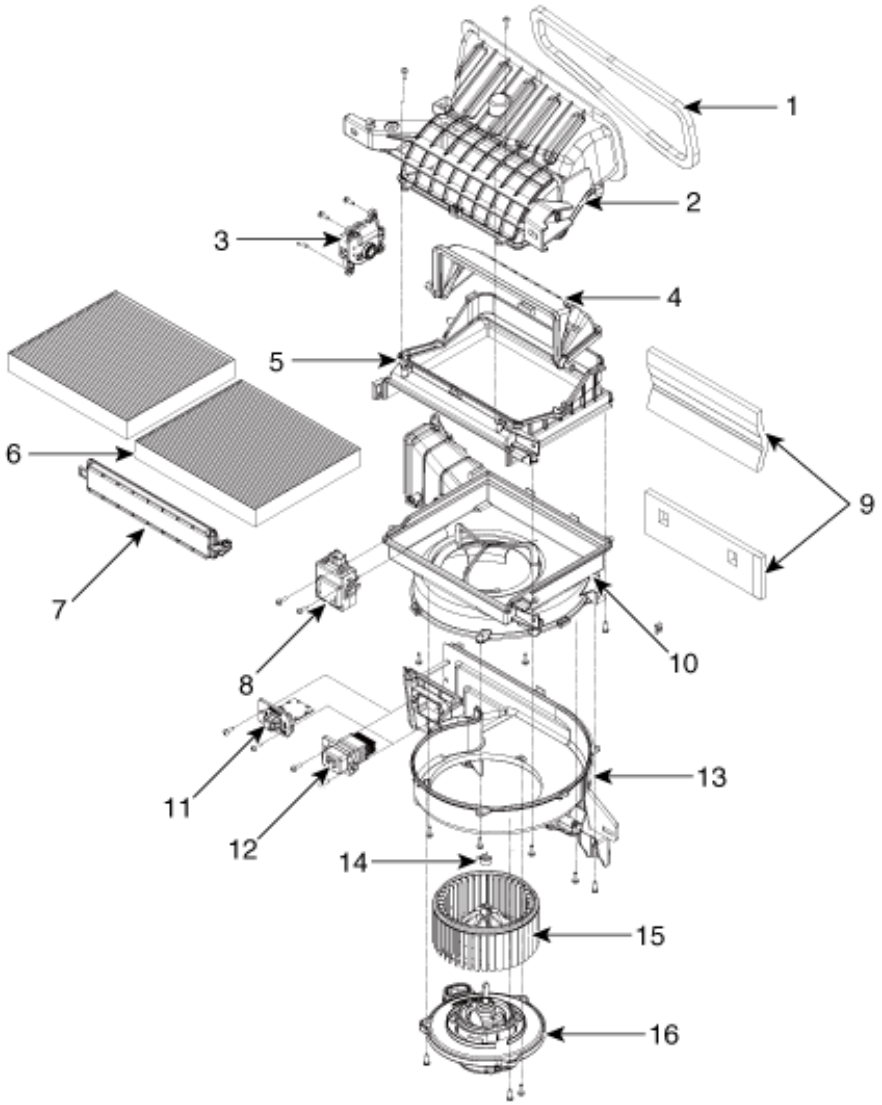
4. Install in the reverse order of removal.

- Components Location



1. Blower unit assembly

- Components



1. Intake seal
2. Intake upper case
3. Intake actuator
4. Intake door
5. Intake lower case
6. Climate control air filter
7. Air filter cover
8. Cluster ionizer
9. Noise protection pad
10. Blower upper case
11. Blower resistor
12. Power mosfet
13. Blower lower case
14. Clamp
15. Impeller
16. Blower motor assembly

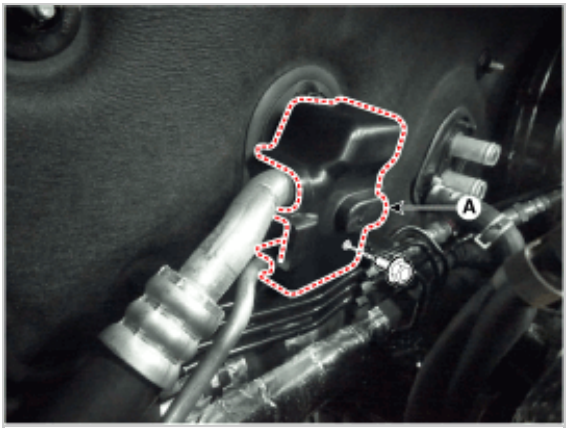
- Replacement

1. Disconnect the negative (-) battery terminal.
2. Recover the refrigerant with a recovery/recycling/charging station.
3. When the engine is cool, drain the engine coolant from the radiator.
   (Refer to Engine Mechanical System - "Coolant")
4. Remove the cowl top cover.

(Refer to Body - "Cowl Top Cover")

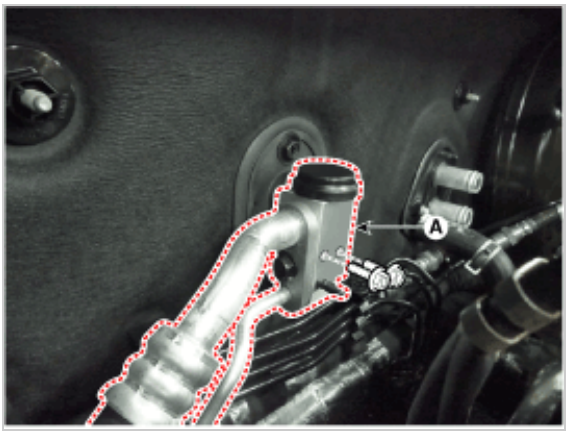
5. Loosen the mounting nut and remove the expension valve cover (A).

Tightening torque :
8.8 - 13.7 N.m (0.9 - 1.4 kgf.m , 6.5 - 10.1 lb-ft)

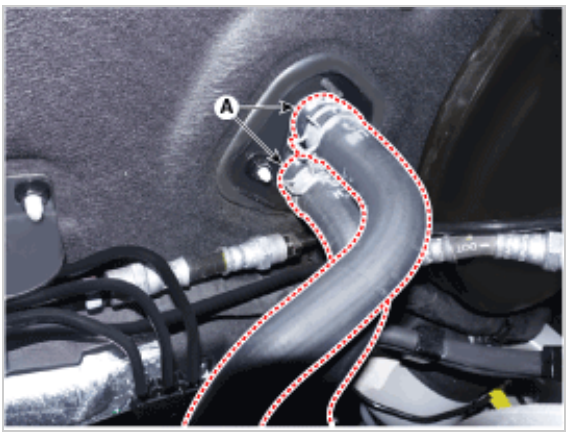


6. Loosen the mounting bolts and separate the expension valve (A) from the evaporator core.

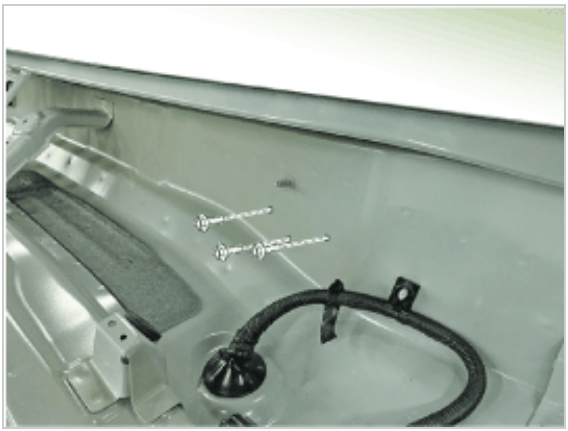
Tightening torque :
8.8 - 13.7 N.m (0.9 - 1.4 kgf.m , 6.5 - 10.1 lb-ft)



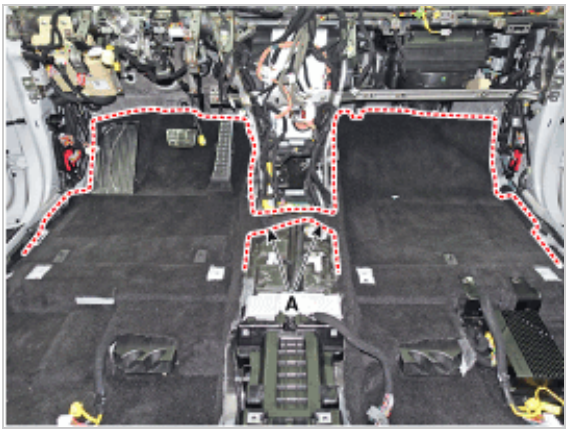
7. Separate the heater hose (A).



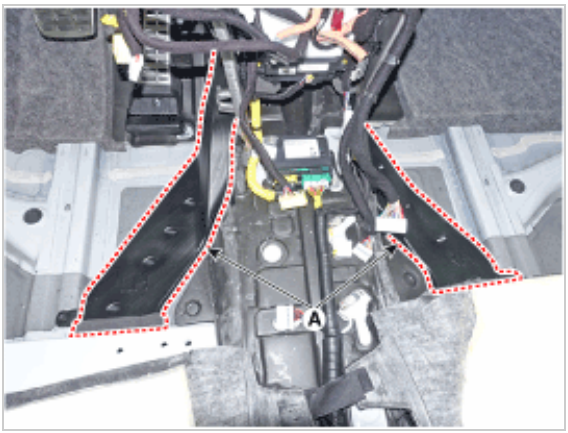
8. Loosen the cowl cross bar assembly mounting bolts.



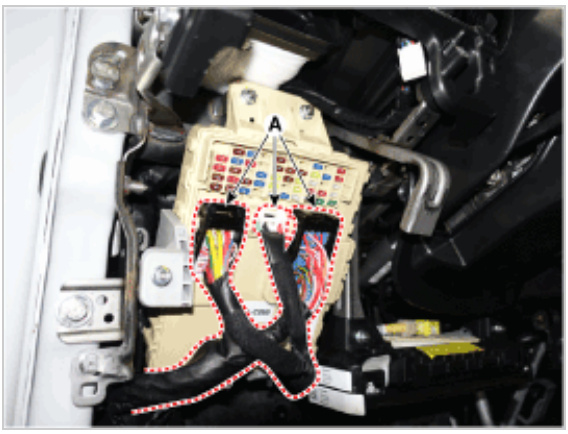
9. Remove the front seat assembly.
   (Refer to Body - "Front Seat Assembly")
10. Remove the floor console assembly.
    (Refer to Body - "Floor Console Assembly")
11. Remove the front pillar trim.
    (Refer to Body - "Front Pillar Trim")
12. Remove the cowl side trim.
    (Refer to Body - "Cowl Side Trim")
13. Remove the crash pad lower panel.
    (Refer to Body - "Crash Pad Lower Panel")
14. Remove the crash pad center panel.
    (Refer to Body - "Crash Pad Cener Panel")
15. Remove the steering column shroud lower panel.
    (Refer to Body - "Steering Column Shroud Panel")
16. Remove the steering wheel.
    (Refer to Steering System - "Steering Wheel")
17. Remove the multifunction switch.
    (Refer to Body Electrical System - "Multifunction Switch")
18. Lower the steering column after loosening the mounting bolts.
    (Refer to Steering System - "Steering Column and Shaft")
19. Remove the front door scuff trim.
    (Refer to Body - "Door Scuff Trim")
20. Remove the shift lever assembly.
    (Refer to Automatic Transaxle System - "Shift Lever")
21. Remove the accelerator pedal.
    (Refer to Engine Control/Fuel System - "Accelerator Pedal")
22. Separate the floor carpet (A) to obtain space for removing the rear heating duct.



23. Loosen the mounting nuts and remove the rear heating duct (A).

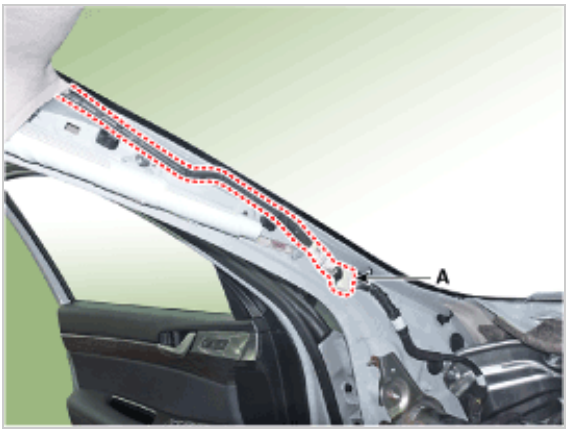


24. Disconnect the junction box connectors (A).

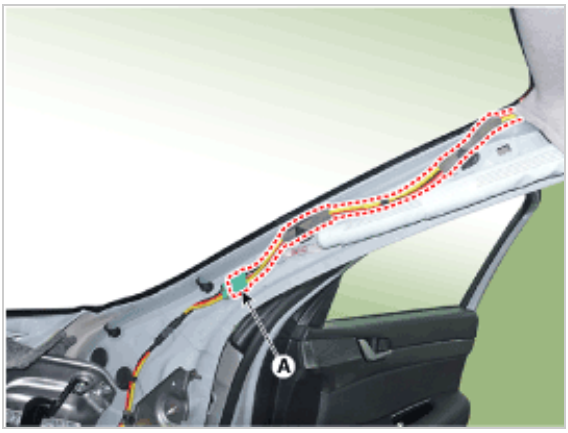


25. Disconnect the multi box connectors (A).

[LH]

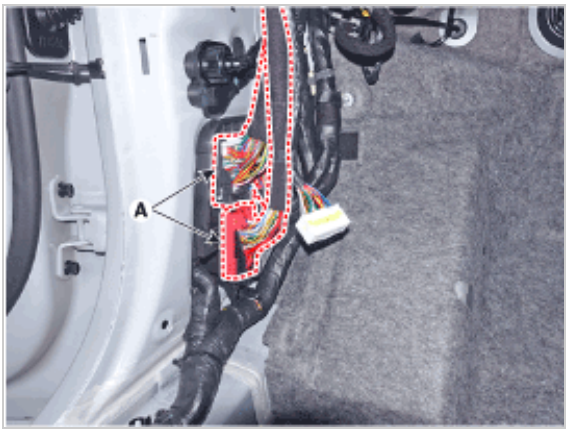


[RH]

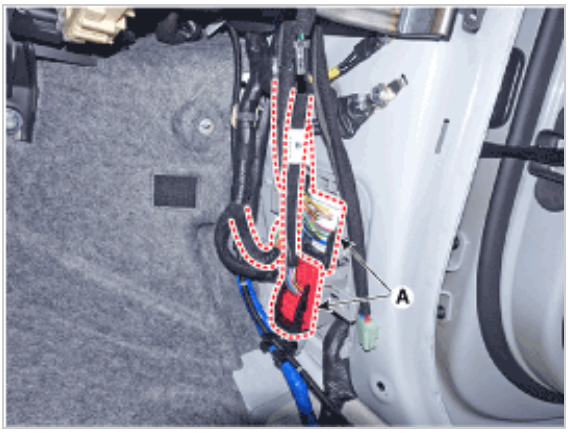


26. Disconnect the multi box connectors (A).

[LH]



[RH]



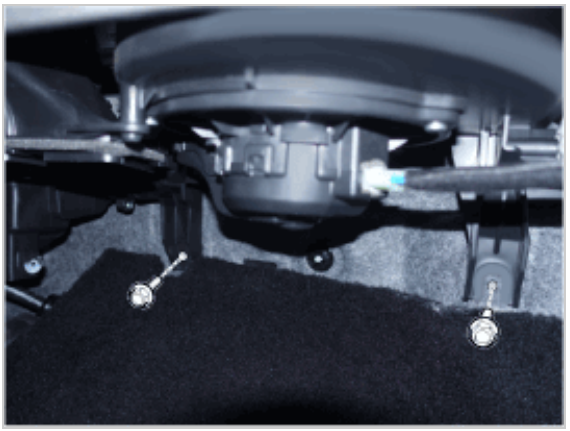
27. Remove the drain hose (A).

28. Remove the lower mounting bolt of the blower unit.

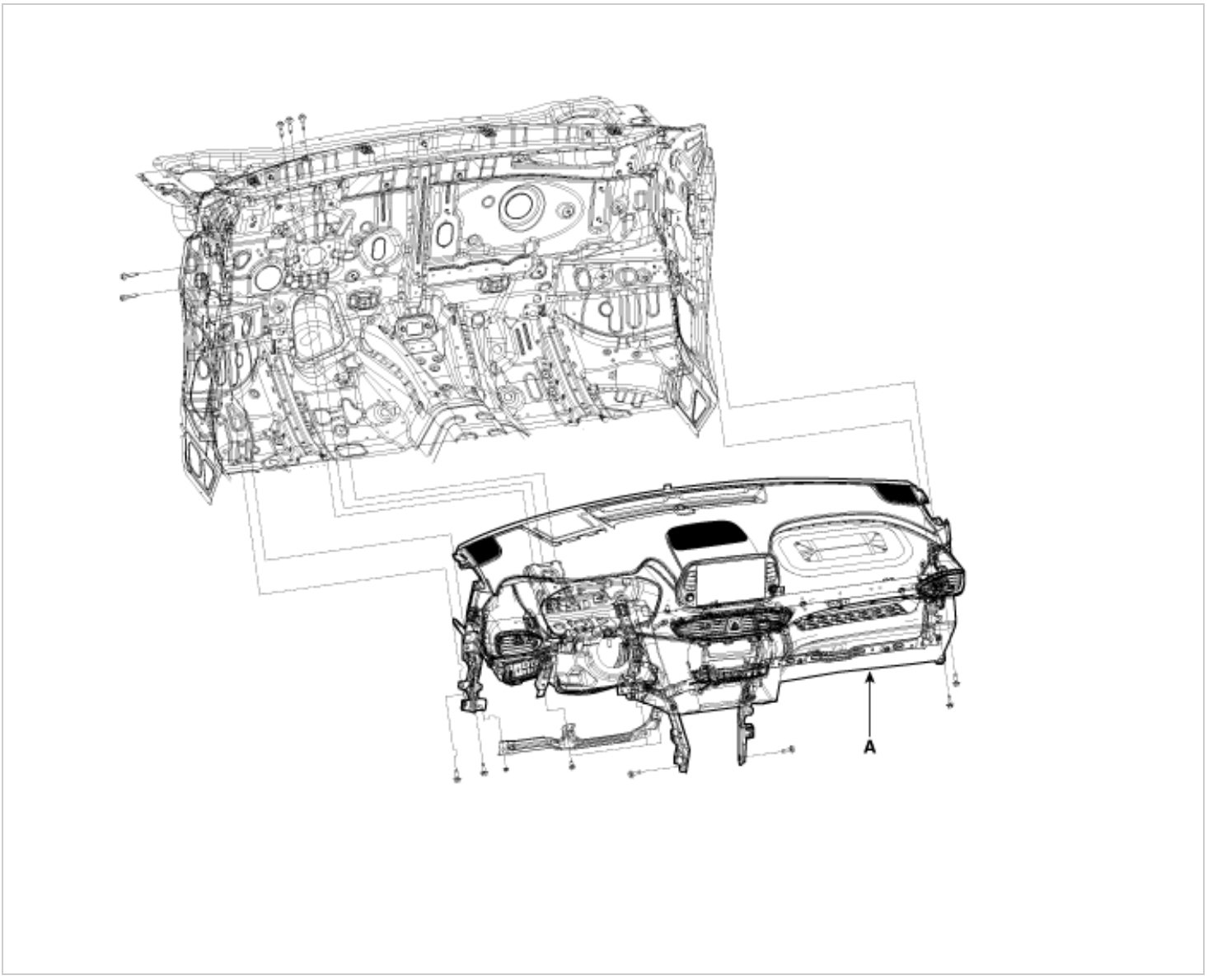
Tightening torque :
3.9 - 5.9 N.m (0.4 - 0.6 kgf.m , 2.9 - 4.3 lb-ft)

[LH]

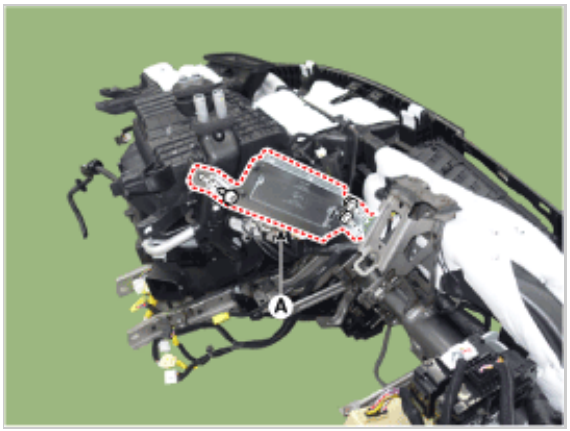
[RH]



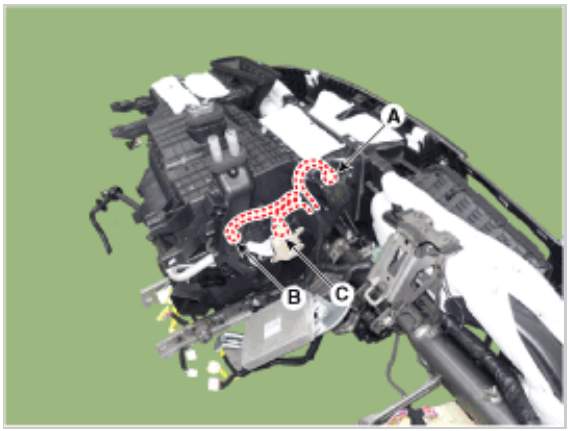
29. After loosening the bolts and nuts remove the crash pad and heater & blower unit assembly (A) together.



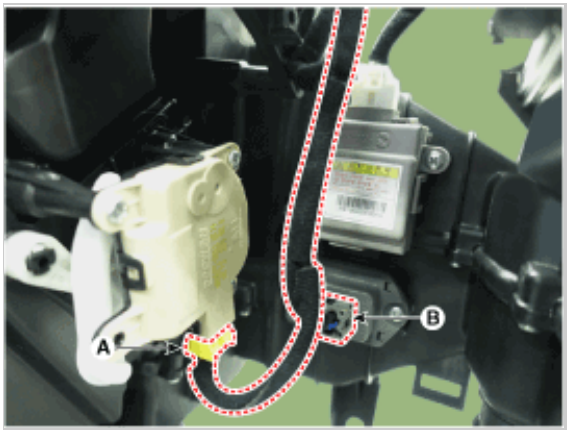
30. Disconnect the heater & blower unit connectors.
    (1) Loosen the mounting nuts, screws and remove the Surround view monitoring (SVM) unit (A).



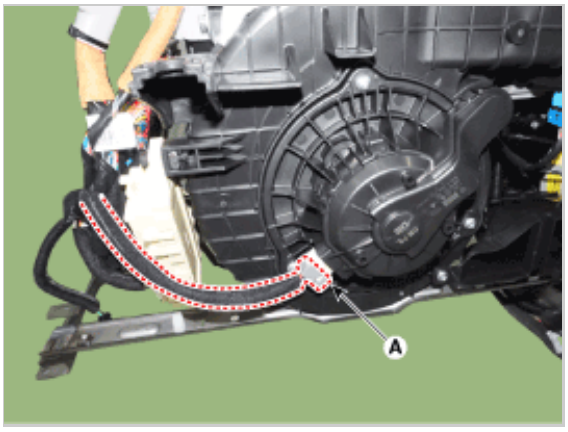
(2) Separate the auto defoging actuator connector(A), evaporator sensor connector(B), temperature control actuator connector(C).



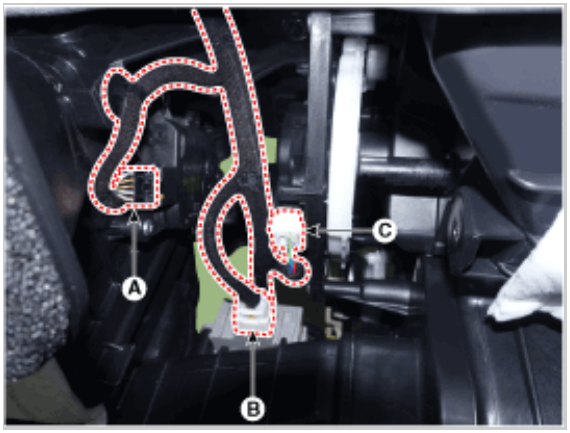
(3) Separate the temperature control actuator [RH] connector (A), power mosfet connector (B).



(4) Separate the blower motor connector (A) and loosen the mounting clip.

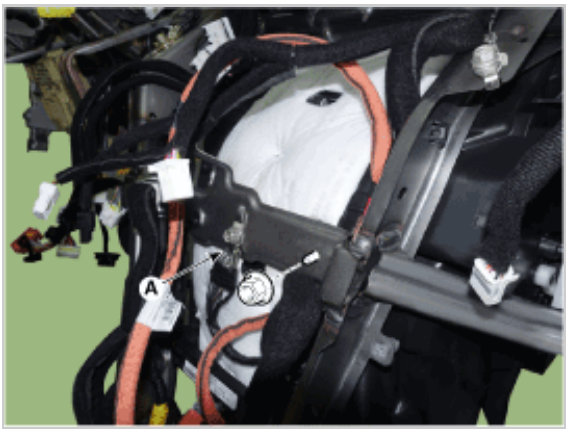


(5) Separate the intake actuator connector (A) , cluster ionizer connector (B) , mode actuator connector (C).



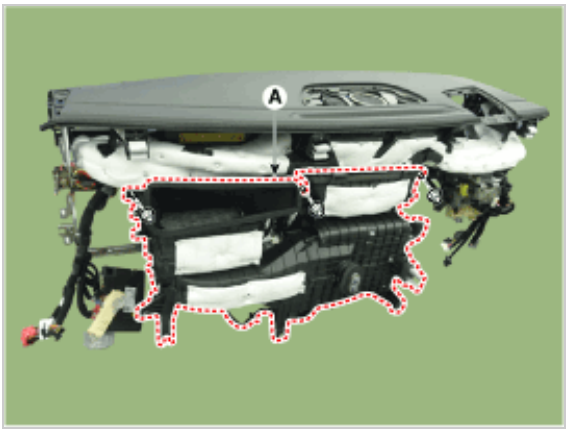
31. Loosen the heater & blower unit mounting bolt (A).

Tightening torque :
3.9 - 5.9 N.m (0.4 - 0.6 kgf.m , 2.9 - 4.3 lb-ft)



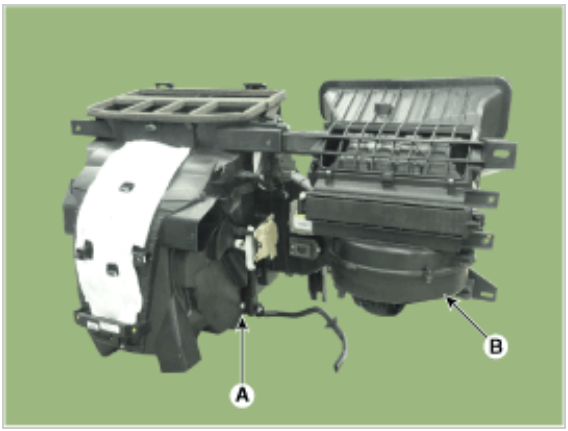
32. Loosen the mounting nuts and remove the heater & blower unit (A) from the crash pad.

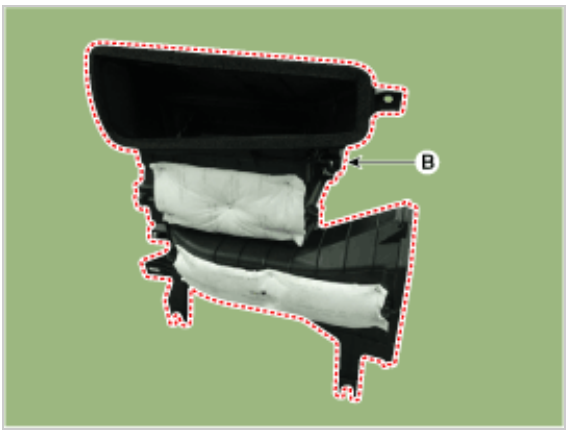
Tightening torque :
3.9 - 5.9 N.m (0.4 - 0.6 kgf.m , 2.9 - 4.3 lb-ft)



33. Loosen the mounting screw and separate the heater unit (A) from the blower unit (B).

Tightening torque :
3.9 - 5.9 N.m (0.4 - 0.6 kgf.m , 2.9 - 4.3 lb-ft)



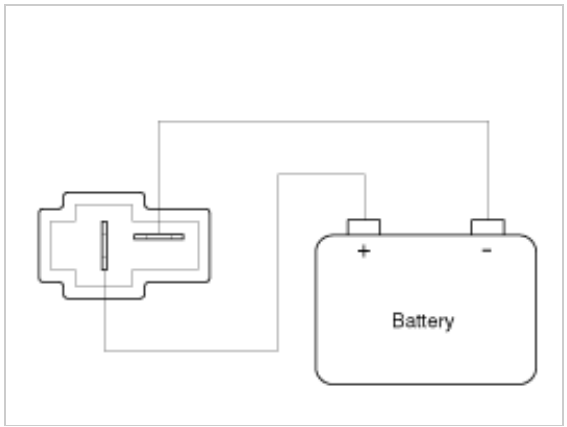


34. Install in the reverse order of removal.

> **Information**
> - Replace any damaged clips (or retainers or fasteners).
> - Make sure the hood latch release cable is connected properly.

- Inspection

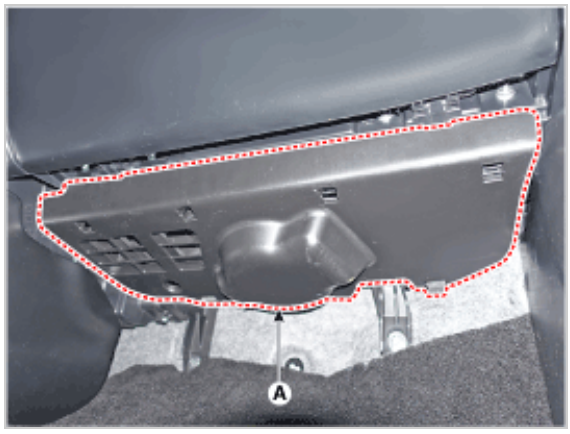
1. Connect the battery voltage and check the blower motor rotation.



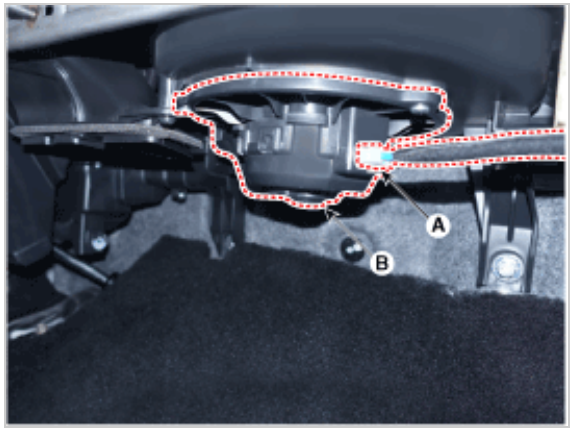
2. If the blower motor does not operate well, substitute with a known-good blower motor and check for proper operation.
3. Replace the blower motor if it is proved that there is a problem with it.

- Replacement

1. Disconnect the negative (-) battery terminal.
2. Remove the passenger side crash pad under cover (A).



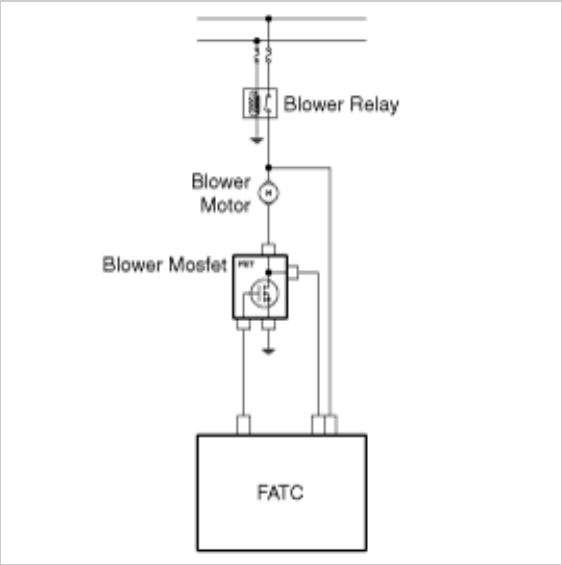
3. Disconnect the blower motor connector (A) and then remove the blower motor (B) after loosening the screws.



4. Install in the reverse order of removal.

- Inspection

1. Turn the ignition switch ON.
2. Manually operate the control switch and measure the voltage of the blower motor.
3. Select the control switch to raise the voltage until high speed.



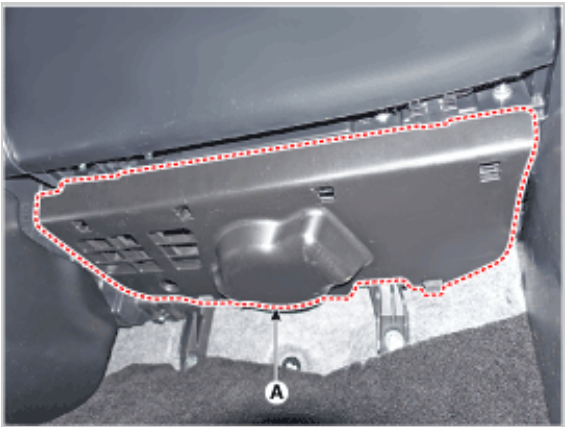
Specification

Fan Speed	Manual Control				Auto Control
	A/C ON		A/C OFF		
	Floor, MIX mode	Not floor, MIX mode	Floor, MIX mode	Not floor, MIX mode	
1	4.5V	3.8V	4.5V	3.8V	~ 4.6V
2	5.3V	5V	5.3V	5V	4.6 ~ 5.5V
3	6.2V	6.1V	6.2V	6.1V	5.5 ~ 6.6V
4	6.9V	7.3V	6.9V	7.3V	6.6 ~ 7.8V
5	8.0V	8.5V	8.0V	8.5V	7.8 ~ 9.0V
6	9.2V	9.7V	9.2V	9.7V	9.0 ~ 10.2V
7	11.0V	10.9V	11.0V	10.9V	10.2 ~ 12.5V
8	BATTERY (B+)				

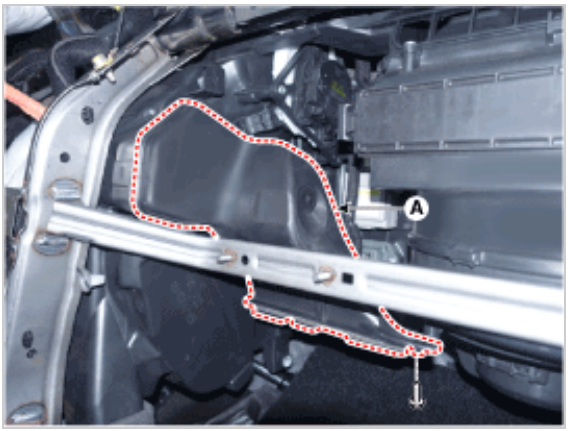
4. If the measured voltage is not within specification, substitute with a known-good power mosfet and check for proper operation.
5. Replace the power mosfet if it is proved that there is a problem with it.

- Replacement

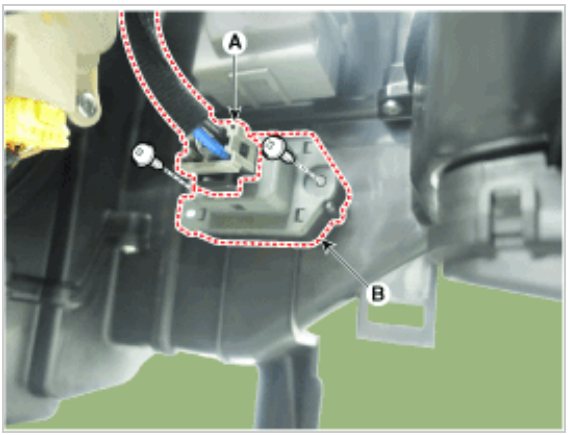
1. Disconnect the negative (-) battery terminal.
2. Remove the passenger side crash pad under cover (A).



3. Loosen the mounting screws and remove the passenger shower duct (A).



4. Separate the connector (A), loosen the mounting screws and remove the power mosfet (B).



5. Install in the reverse order of removal.

Heating,Ventilation And Air Conditioning

- Description

The climate control air filter is located in the blower unit. It eliminates foreign materials and odor. The particle filter performs a role as an odor filter as well as a conventional dust filter to ensure comfortable interior environment.

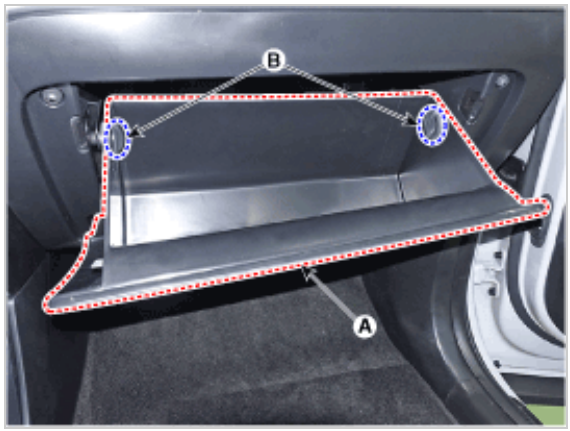
Heating,Ventilation And Air Conditioning

- Replacement

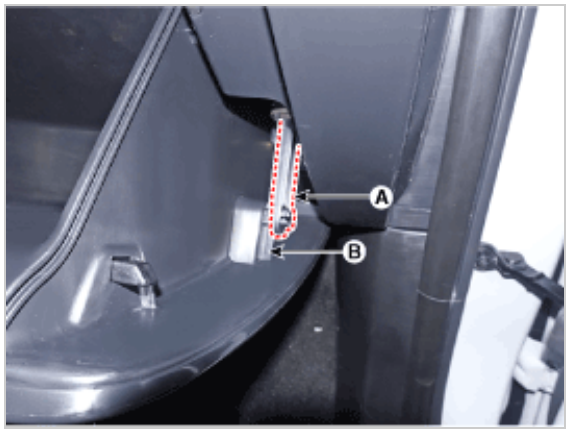
⚠ CAUTION

- When removing with a flat-tip screwdriver or remover, wrap protective tape around the tools to prevent damage to components.
- Put on gloves to prevent hand injuries.

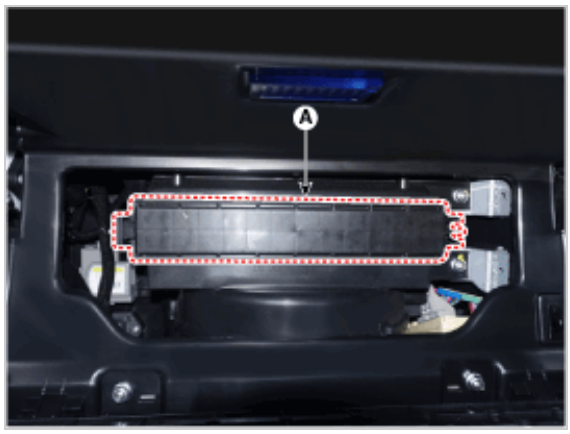
1. Remove the stopper (B) from the glove box (A).



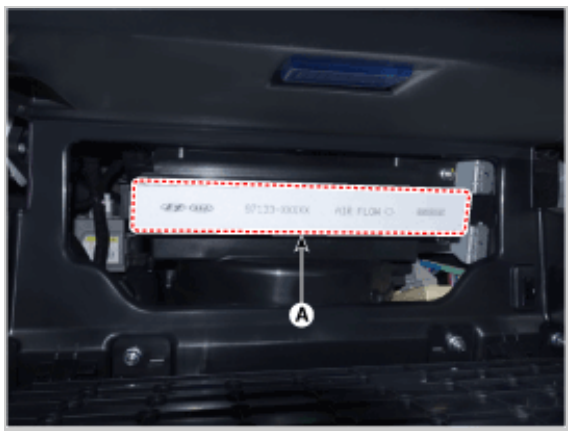
2. Remove the air damper (A) from the glove box (B).



3. Remove the filter cover (A) by pressing the knob.



4. Replace the air filter (A) with a new one according to the direction of air filter.



5. Install in the reverse order of removal.

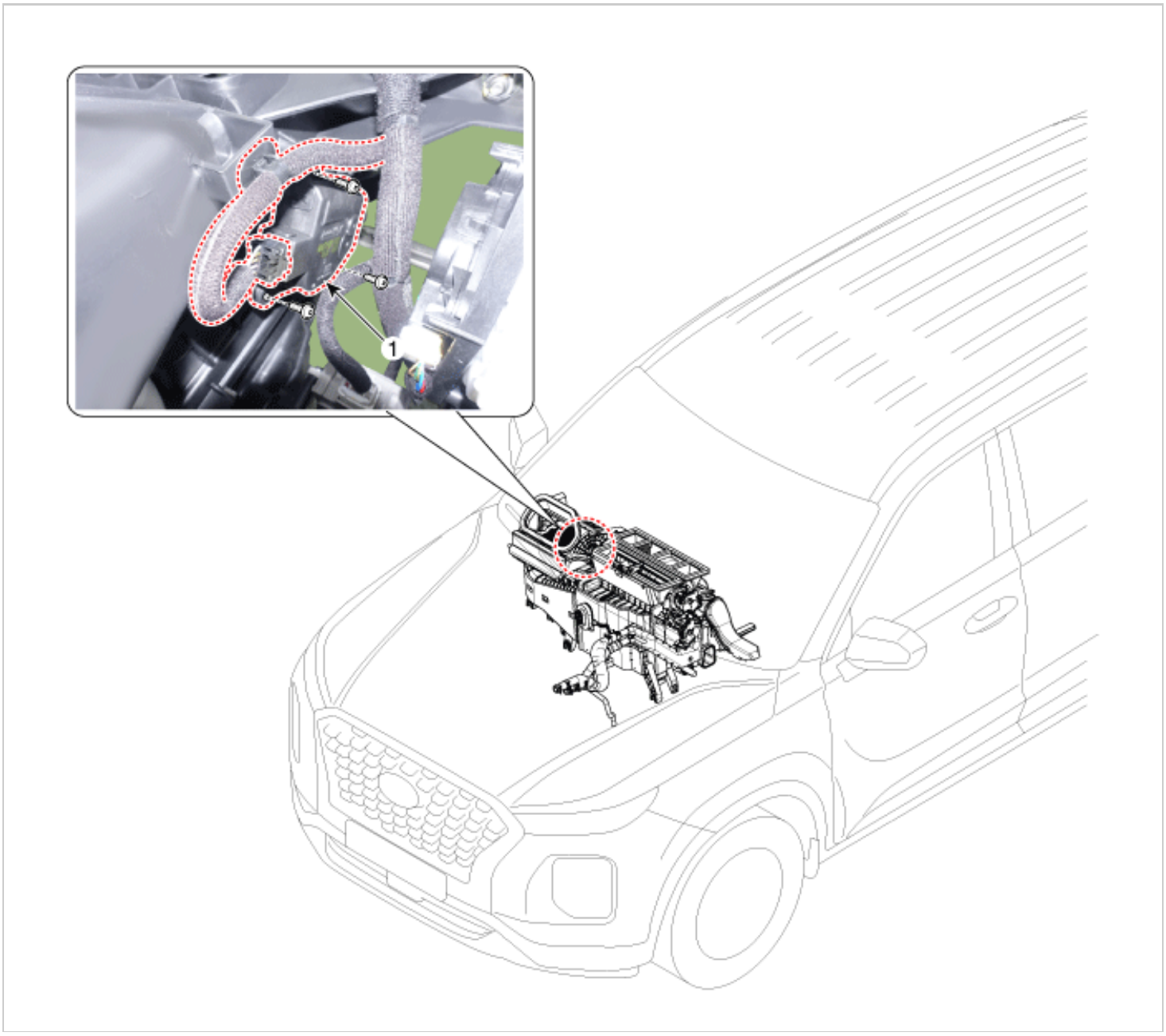
Information

- To remove the filter easily, press the right side inward then pull out the filter.
- In case of driving in an air-polluted area or rugged terrain, check and replace the air filter as frequently as possible.

- Description

The intake actuator is located at the blower unit. It regulates the intake door by a signal from the control unit. Pressing the intake selection switch will shift between recirculation and fresh air modes.

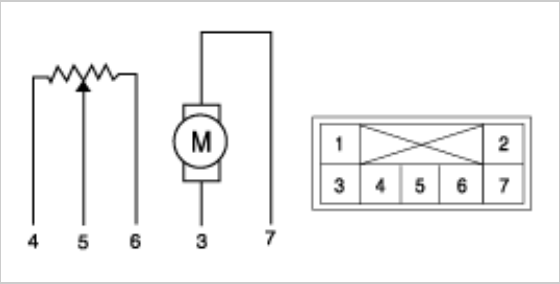
- Components



1. Intake actuator

- Inspection

1. Turn the ignition switch OFF.
2. Disconnect the intake actuator connector.
3. Verify that the intake actuator operates to the fresh air position when connecting 12V to terminal 3 and grounding terminal 7.
   Verify that the intake actuator operates to the recirculated air position when connected in reverse.



1. -
2. -
3. Fresh air
4. Recirculated air
5. Sensor power (+ 5V)
6. Feedback signal
7. Sensor ground

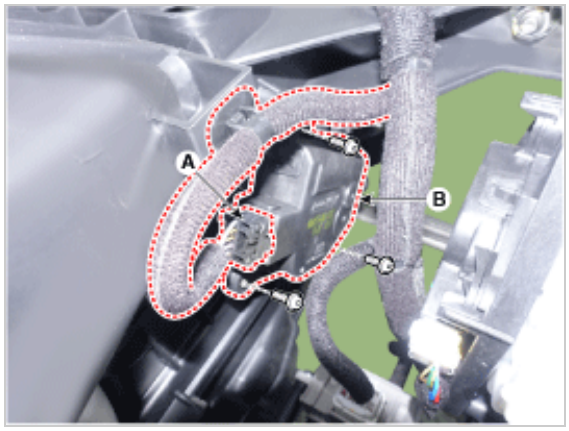
4. Connect the intake actuator connector.
5. Turn the ignition switch ON.
6. Check the voltage between terminal 5 and 6.
   Specification

Door position	Voltage (V)	Error detecting
Fresh air	0.5±0.15	Low voltage : 0.1V or less High voltage : 4.9V or less
Recirculated air	4.5±0.15	

   It will feedback the current position of the actuator to controls.
7. If the intake actuator does not operate well, substitute with a known-good intake actuator and check for proper operation.
8. Replace the intake actuator if it is proved that there is a problem with it.

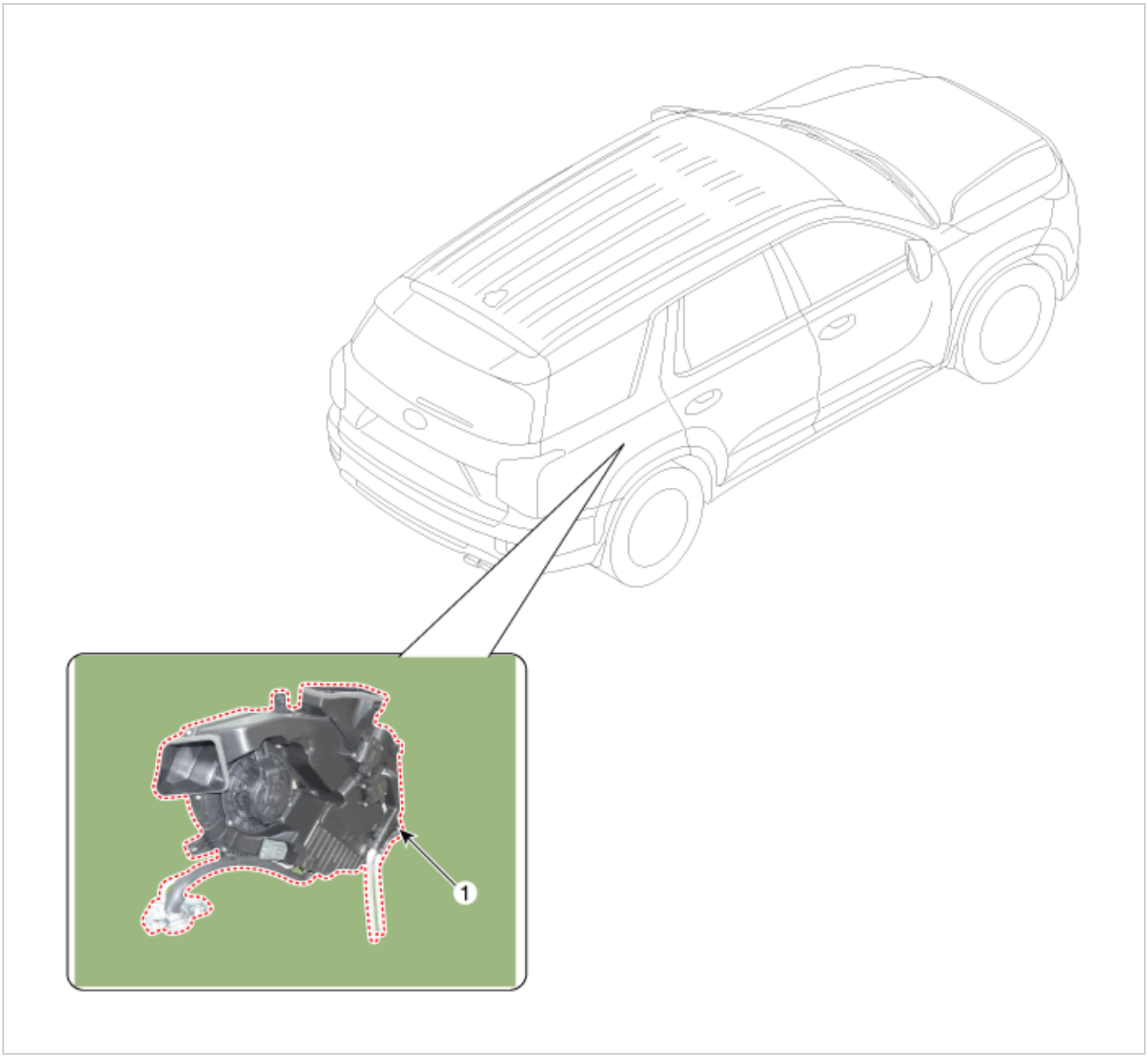
- Replacement

1. Disconnect the negative (-) battery terminal.
2. Remove the main crash pad assembly.
   (Refer to Body - "Main Crash Pad Assembly")
3. Separate the intake actuator connector (A), loosen the mounting screws and remove the intake actuator (B).



4. Install in the reverse order of removal.

- Component Location



1. Rear Heater & A/C Unit

- Replacement

⚠ CAUTION

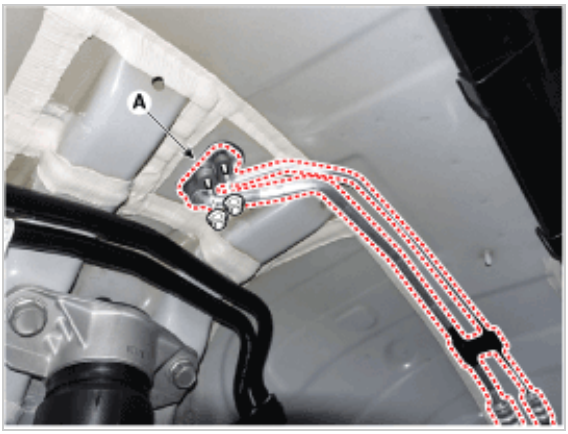
- Be careful not to damage the parts located under the vehicle (floor under cover, fuel filter, fuel tank and canister) when raising the vehicle using the lift.
  (Refer to General Information - "Lift and Support Points")

1. Disconnect the negative (-) battery terminal.
2. Recover the refrigerant with a recovery/charging station.
3. Remove the luggage side trim [RH]

(Refer to Body - "Luggage Side Trim")

4. Remove the rear wheel guard [RH].
   (Refer to Body - "Rear Wheel Guard")
5. Loosen the mounting nuts and remove the refrigeration line (A).

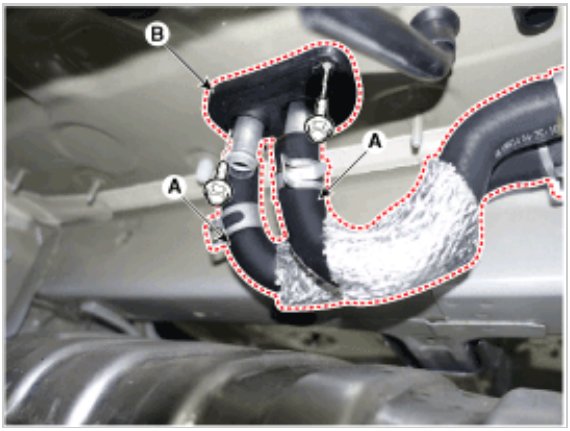
Tightening torque :
8.8 - 13.7 N.m (0.9 - 1.4 kgf.m, 6.5 - 10.1 lb-ft)



NOTICE

- Plug or cap the lines immediately after disconnecting them to avoid moisture and dust contamination.

6. Press the lock pin and separate the rear heater hose (A), loosen the mounting bolts and remove the braket (B).



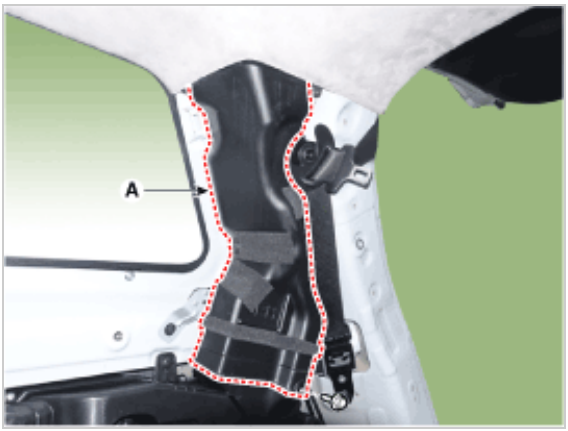
⚠ CAUTION

- Coolant flows when hose is disconnected. Clean the water immediately, as it will damage the electrical parts and coating surfaces.

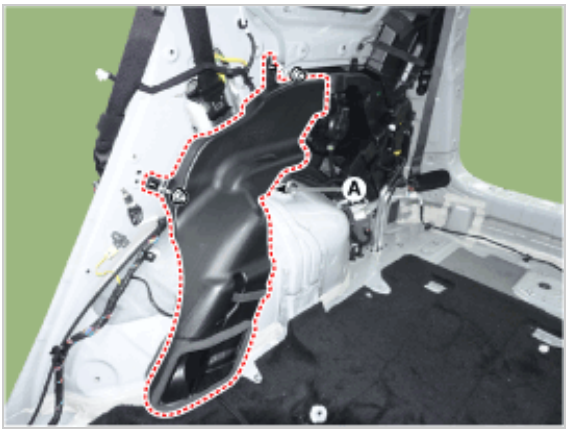
7. Loosen the mounting nuts, clips and remove the rear air duct (A).

Tightening torque :
8.8 - 13.7 N.m (0.9 - 1.4 kgf.m, 6.5 - 10.1 lb-ft)

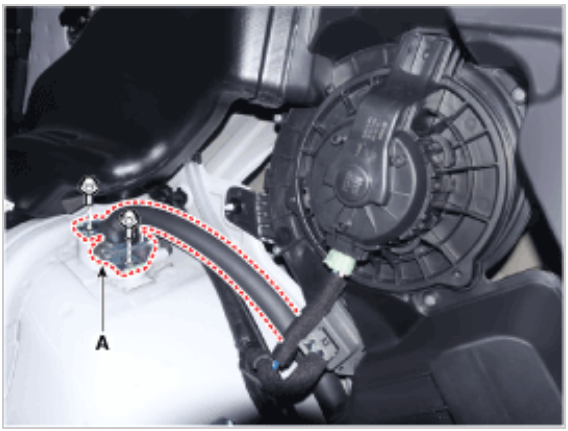
[Upper]



[Lower]

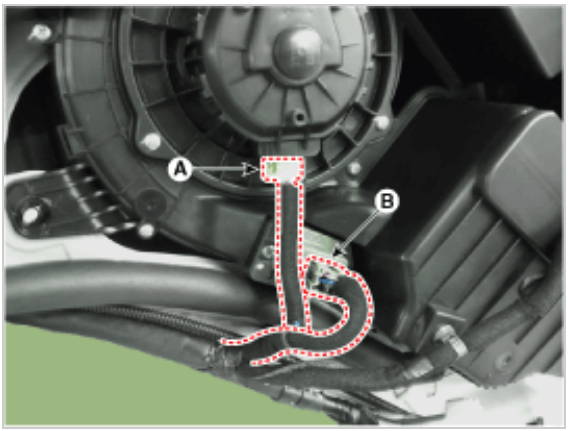


8. Loosen the rear evaporator pipe (A) mounting bolts.

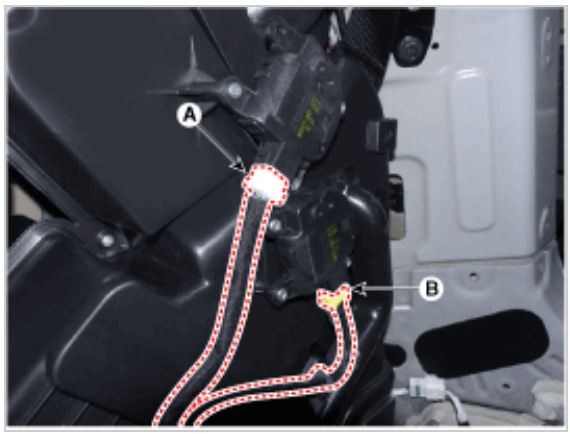


9. Remove the drain hose (A) from rear heater & A/C unit.

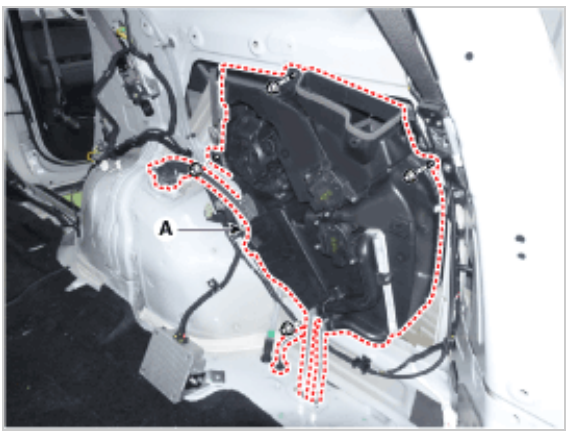
10. Press the lock pin and separate the blower motor connector (A) and rear power mosfet connector (B).



11. Press the lock pin and separate the rear mode control actuator connector (A) and rear temperature control actuator connector (B).



12. Loosen the mounting nuts, bolts and remove the rear heater & A/C unit (A).



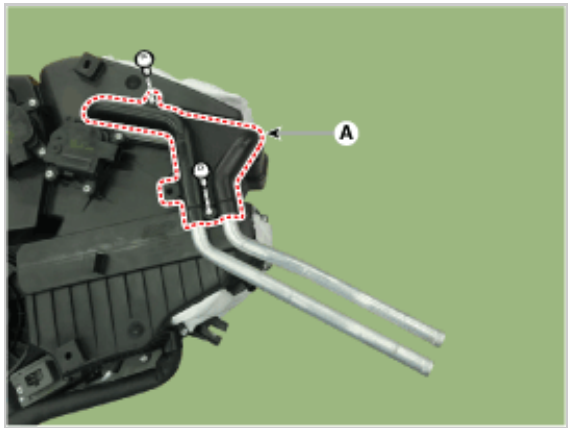
13. Install in the reverse order of removal.

Information

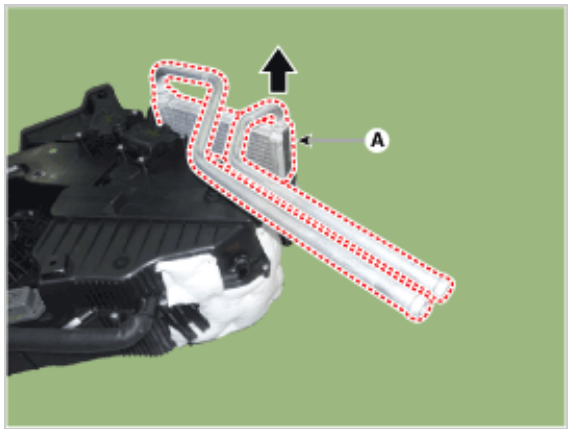
- Make sure the connector is connected in properly.
- Replace any damaged clips.

- Replacement

1. Remove the rear heater & A/C unit.
   (Refer to Rear Heater - "Rear Heater Unit")
2. Loosen the mounting screws and remove the rear heater core cover (A).



3. Remove the heater cover (A).



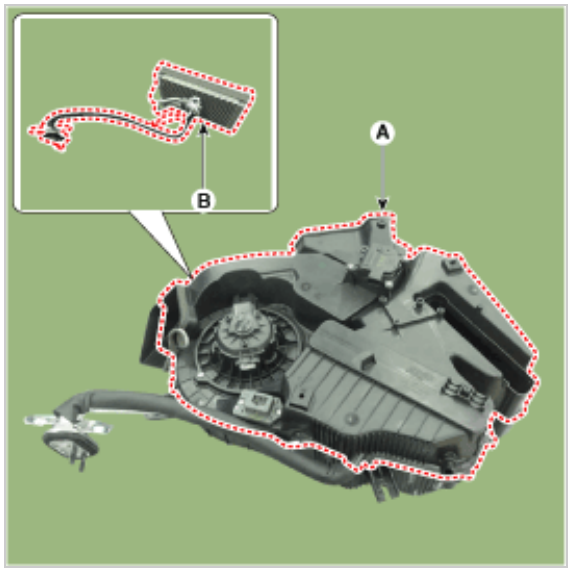
4. Install in the reverse order of removal.

CAUTION

- Be careful that the coolant may flow when removing the heater core.

- Replacement

1. Remove the rear heater & A/C unit.
   (Refer to Rear Heater - "Rear Heater Unit")
2. Loosen the mounting screws, remove the rear heater & A/C unit cover (A) and evaporator core (B).

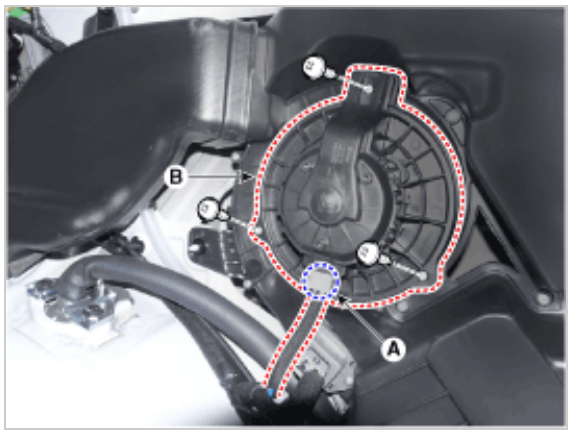


3. Install in the reverse order of removal.

Heating,Ventilation And Air Conditioning

- Replacement

1. Disconnect the negative (-) battery terminal.
2. Remove the luggage side trim
   (Refer to Body - "Luggage Side Trim ")
3. Separate the rear blower motor connector (A), loosen the mounting screws and remove the rear blower motor (B).



4. Install in the reverse order of removal.

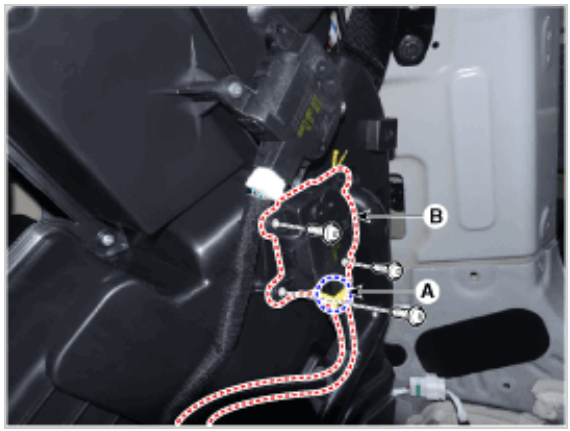
Information

- Make sure the connector is connected in properly.

Heating,Ventilation And Air Conditioning

- Replacement

1. Disconnect the negative (-) battery terminal.
2. Remove the luggage side trim
   (Refer to Body - "Luggage Side Trim ")
3. Separate the rear temperature actuator connector (A), loosen the mounting screws and remove the rear temperature actuator (B).



4. Install in the reverse order of removal.

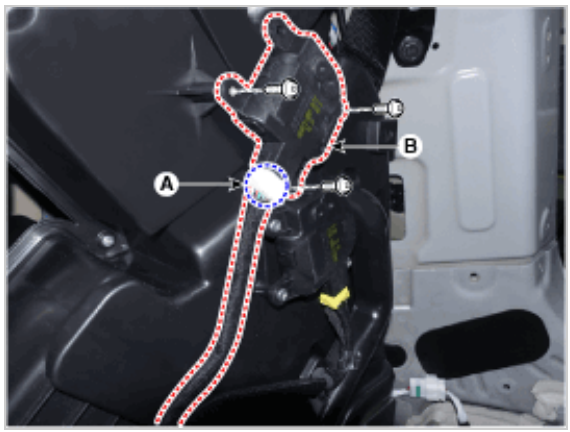
Information

- Make sure the connector is connected in properly.

Heating,Ventilation And Air Conditioning

- Replacement

1. Disconnect the negative (-) battery terminal.
2. Remove the luggage side trim
   (Refer to Body - "Luggage Side Trim ")
3. Separate the rear mode actuator connector (A), loosen the mounting screws and remove the rear mode actuator (B).



4. Install in the reverse order of removal.

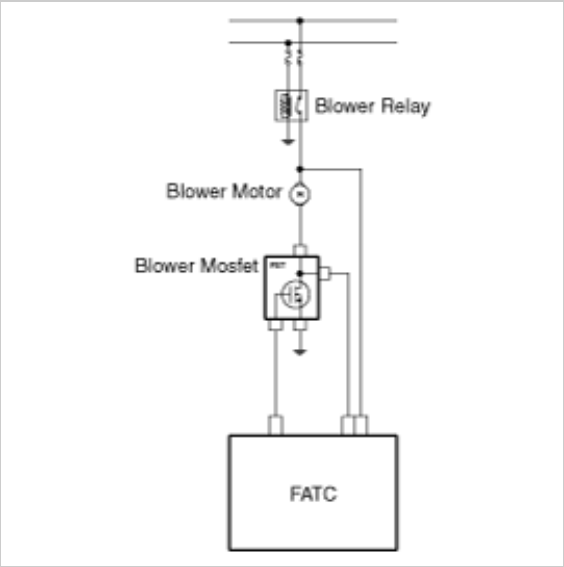
Information

- Make sure the connector is connected in properly.

Heating,Ventilation And Air Conditioning

- Inspection

1. Turn the ignition switch ON.
2. Manually operate the control switch and measure the voltage of the blower motor.
3. Select the control switch to raise the voltage until it reaches high speed.



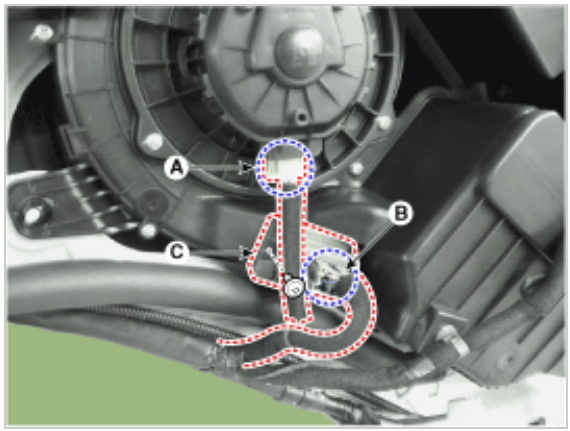
Specification

Fan	Motor Voltage
	Manual
First speed	3.8 ± 0.5V
Second speed	5.0 ± 0.5V
Third speed	6.2 ± 0.5V
Fourth speed	7.4 ± 0.5V
Fifth speed	8.6 ± 0.5V
Sixth speed	9.8 ± 0.5V
Seventh speed	11.0 ± 0.5V
Eighth speed	Battery (+)

4. If the measured voltage is not within specification, substitute with a known-good power mosfet and check for proper operation.
5. Replace the power mosfet if it is proved that there is a problem with it.

- Replacement

1. Disconnect the negative (-) battery terminal.
2. Remove the luggage side trim
   (Refer to Body - "Luggage Side Trim ")
3. Separate the rear blower motor connector (A), rear power mosfet connector (B) and loosen the mounting screws and remove the rear power mosfet (C).

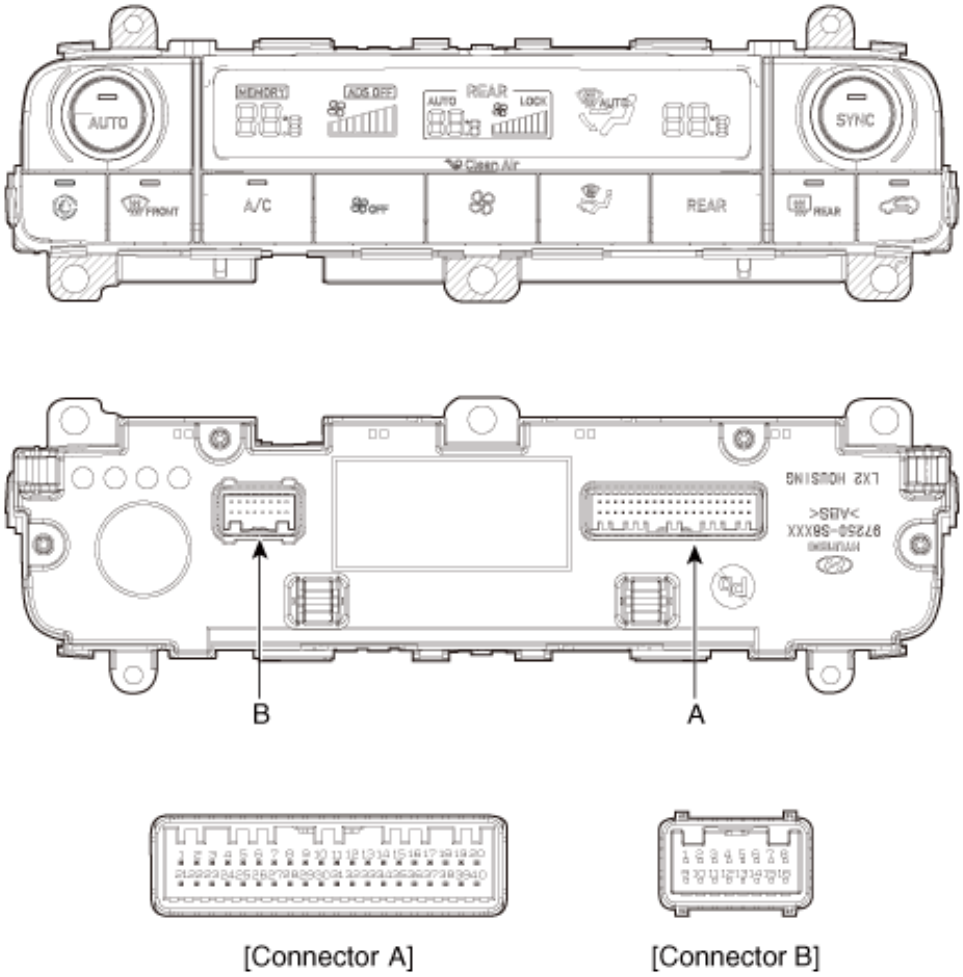


4. Install in the reverse order of removal.

Information

- Make sure the connector is connected in properly.

- Component



[Connector A]

[Connector B]

Connector Pin Function

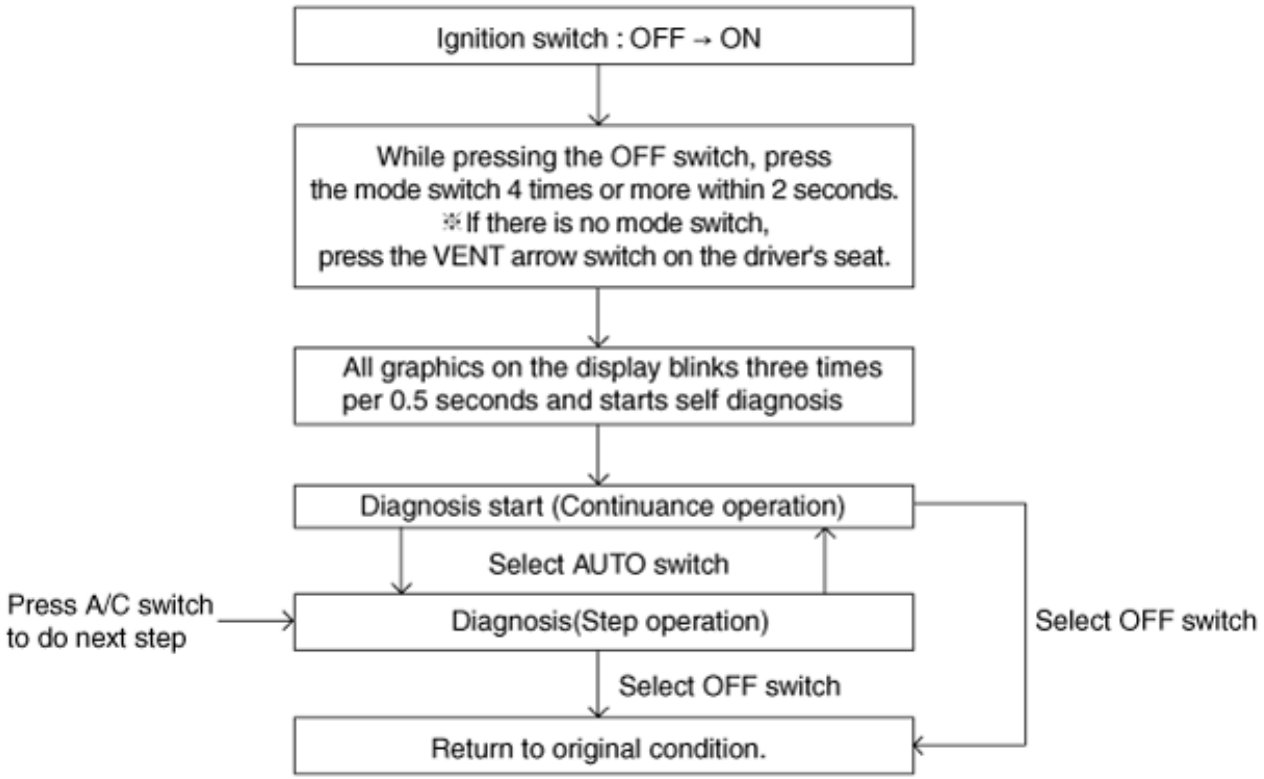
Connector	PIN No	Pin Function	Connector	PIN No	Pin Function
A	1	Battery	A	21	IGN2
	2	ISG B+		22	IGN1
	3	ILL+ (TAIL)		23	Blower Motor (+)
	4	Sensor Ground REF (+5V)		24	Photo Sensor (-)_LEFT
	5	Mode Control Actuator Feedback		25	Photo Sensor (-)_RIGHT
	6	Temperature Actuator Feedback - Driver		26	Incar Sensor (+)
	7	Intake Actuator Feedback		27	Incar Motor (-)
	8	Evaporator Temperature Sensor (+)		28	PTC Relay 3
	9	Ambient Temperature Sensor (+)		29	PTC Relay 3
	10	Mode Control Actuator (Vent)		30	PTC On Signal
	11	Mode Control Actuator (Defrost)		31	Detent out (-)

	12	Temperature Control Actuator (Cool) - Driver		32	K - Line
	13	Temperature Control Actuator (Warm) - Driver		33	P_CAN High
	14	Intake Actuator (Fresh Air)		34	P_CAN Low
	15	Intake Actuator (Recirculated Air)		35	Mosfet (DRAIN F/B)
	16	HTD (Rear Defrost)		36	Mosfet (GATE)
	17	Rear Defogging Swich		37	ECV +
	18	Clean Signal		38	ECV -
	19	Ionizer Diagnosis		39	Sensor Ground
	20	ILL - (RHEO)		40	Ground

Connector	PIN No	Pin Function	Connector	PIN No	Pin Function
B	1	Temperature Control Actuator Feedback - Passenger	B	9	-
	2	Temperature Control Actuator (Cool) - Passenger		10	-
	3	Temperature Control Actuator (Warm) - Passenger		11	-
	4	Defogging Actuator Feedback		12	Defogging Sensor TEMP
	5	Defogging Actuator (Open)		13	Defogging Sensor SCK
	6	Defogging Actuator (Close)		14	Defogging Sensor Data
	7	-		15	-
	8	Seat Signal PWM - Driver		16	Ground

- Self Diagnosis

1. Self-diagnosis process.

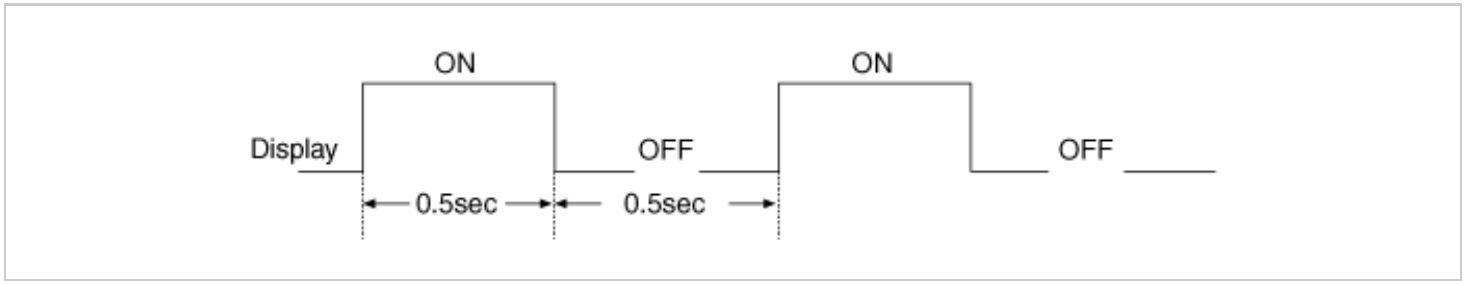

Ignition switch : OFF → ON
While pressing the OFF switch, press
the mode switch 4 times or more within 2 seconds.
※ If there is no mode switch,
press the VENT arrow switch on the driver's seat.
All graphics on the display blinks three times
per 0.5 seconds and starts self diagnosis
Diagnosis start (Continuance operation)
Select AUTO switch
Press A/C switch
to do next step
Diagnosis(Step operation)
Select OFF switch
Select OFF switch
Return to original condition.

NOTICE

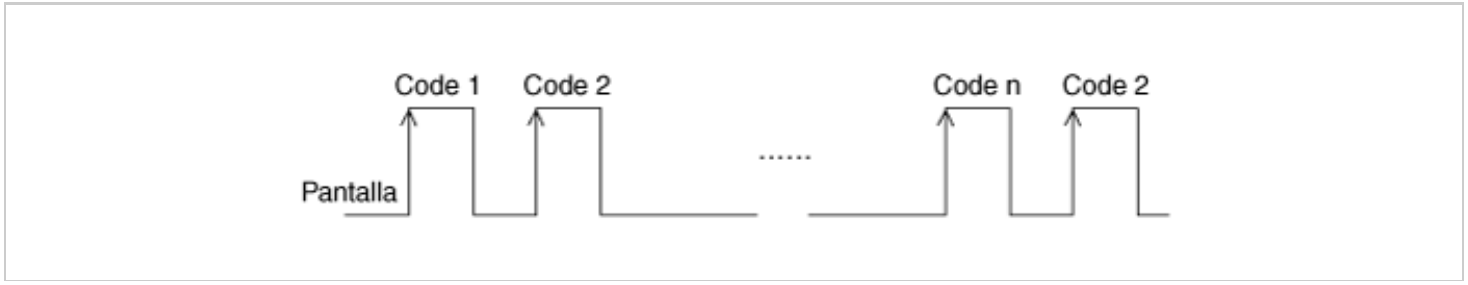
- When operating the self-diagnostics, the below fault(self-diagnostics code) will blink at 0.5 seconds interval on the temperature display settings(driver's side only) and the remaining symbols are OFF .

2. Fault code display

(1) Continuance operation : DTC code.



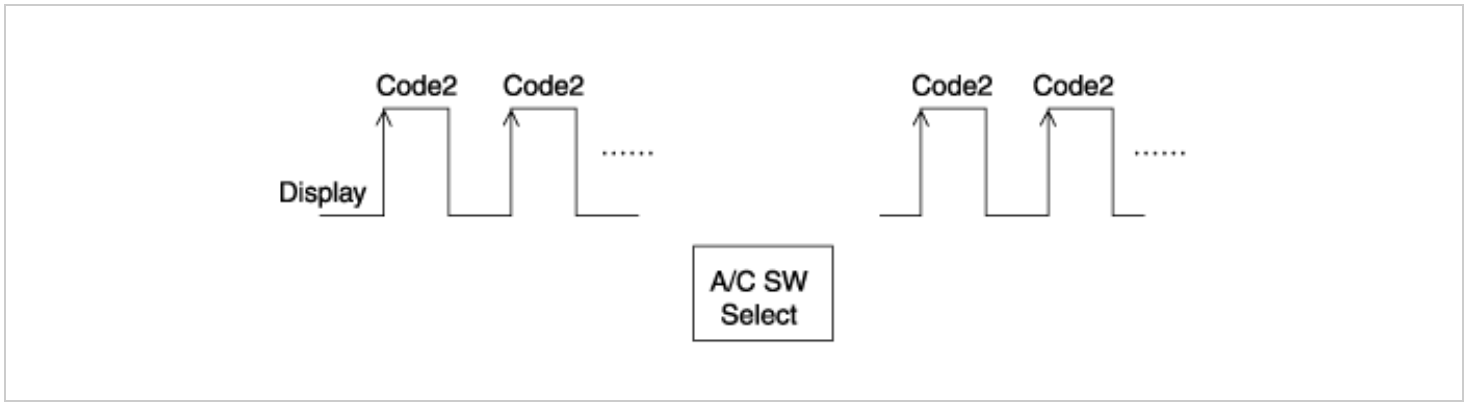
(2) Continuance operation : DTC code.



(3) STEP operation.

A. Nomal or one fault code is same as a continuance operation.

B. DTC code.



3.

Display	Fail description	Remarks
0	Normal	
11	Interior Temperature Sensor Disconnection (OPEN, INCAR F/B Voltage ≥ 4.9V)	
12	Interior Temperature Sensor Short Circuit (SHORT, INCAR F/B Voltage ≤ 0.1V)	
13	External Temperature Sensor Disconnection (OPEN , AMBIENT F/B Voltage ≥ 4.9V)	
14	External Temperature Sensor Short Circuit (SHORT, AMBIENT F/B Voltage ≤ 0.1V)	
17	Evaporator Temperature Sensor Disconnection (OPEN, EVAP F/B Voltage ≥ 4.9V)	
18	Evaporator Temperature Sensor Short Circuit (SHORT, EVAP F/B Voltage ≤ 0.1V)	
19	Driver Seat Temperature Control Actuator Feedback Disconnection/Short Circuit (OPEN/SHORT) SHORT Range [TEMP F/B Voltage ≤ 0.1V] OPEN Range [TEMP F/B Voltage ≥ 4.9V]	
20	Driver Seat Temperature Control Actuator Motor Constraint (Note that if both the target and constraint ranges fall within the MAX COOL range [0.1V < TEMP FB voltage ≤ 0.5V] and MAX WARM range [4.5V ≤ TEMP FB voltage < 4.9V], the error code 20 is not displayed because there is no longer any constraint. This will prevent MAX WARM and MAX COOL displaying the code 20 due to error margins of the Actuator and FATC.)	If the actuator cannot reach the desired control position in 10 seconds, then it is deemed constrained
21	Driver Seat Mode Actuator Feedback Disconnection/Short Circuit SHORT Range [DR MODE F/B Voltage ≤ 0.1V] OPEN Range [DR MODE F/B Voltage ≥ 4.9V]	
22	Driver Seat Mode Actuator Motor Constraint (Note that if both the target and constraint ranges fall within the VENT range [0.1V < DR MODE FB voltage ≤ 0.5V] and DEF range [4.5V ≤ DR MODE FB voltage < 4.9V], the error code 22 is not displayed because there is no longer any constraint. This will prevent VENT and DEF displaying the code 22 due to error margins of the Actuator and FATC.)	If the actuator cannot reach the desired control position in 10 seconds, then it is deemed constrained
25	Internal/External Air Actuator Position Sensor Disconnection/Short Circuit SHORT Range [INTAKE F/B Voltage ≤ 0.1V] OPEN Range [INTAKE F/B Voltage ≥ 4.9V]	

26	Internal/External Air Actuator Motor Constraint (Note that if both the target and constraint ranges fall within the FRE range [0.1V < INTAKE FB voltage ≤ 0.5V] REC range [4.5V ≤ INTAKE FB voltage < 4.9V], the error code 26 is not displayed because there is no longer any constraint. This will prevent FRE and REC displaying the code 26 due to error margins of the Actuator and FATC.)	
32	Passenger Seat Temperature Control Actuator Feedback Disconnection/Short Circuit (OPEN/SHORT) SHORT Range [TEMP F/B Voltage ≤ 0.1V] OPEN Range [TEMP F/B Voltage ≥ 4.9V]	
33	Passenger Seat Temperature Control Actuator Motor Constraint (Note that if both the target and constraint ranges fall within the MAX COOL range [0.1V < TEMP FB voltage ≤ 0.5V] and MAX WARM range [4.5V ≤ TEMP FB voltage < 4.9V], the error code 20 is not displayed because there is no longer any constraint. This will prevent MAX WARM and MAX COOL displaying the code 20 due to error margins of the Actuator and FATC.)	If the actuator cannot reach the desired control position in 10 seconds, then it is deemed constrained
45	APT CAN Signal Error	
47	RPM CAN SIGNAL Error	
48	Vehicle Speed CAN Signal Error	
49	Engine coolant temperature CAN Signal Error	

4. FAIL SAFE

NO	SIGNAL / ITEM	Failure Criteria	Alternative Value in Case of Failure	Remarks
1	AMB SENSOR	OPEN/SHORT	"--" displayed on the screen Alternative Control to 20°C	
2	INCAR SENSOR	OPEN/SHORT	Fixed at 25°C	
3	EVA SENSOR	OPEN/SHORT	Fixed at -2°C	
4	TEMP DOOR POTENTION METER	OPEN/SHORT	For temperature set to 22°C or lower, move to the Cool location and fix it there. For temperature set to 22.5°C or higher, move to the Warm location and fix it there.	
5	MODE DOOR POTENTION METER	OPEN/SHORT	Move to and fix the VENT position if VENT Mode is on Fix the DEF position movement if it is not in the "VENT Mode"	
6	INTAKE DOOR POTENTION METER	OPEN/SHORT	For FRE selection, move to the FRE location and fix it there. For REC, move to the REC location and fix it there.	
7	VS (Vehicle Speed)	FFh or Signal not received	1. Take alternative control based on VS_TCU(From TCU2) 2. When both VS and VS_TCU are FFH or not received, processing the Vehicle speed to FAIL(0 Kph alternative control)	
8	VS_TCU (Vehicle speed calculated by TCU)	FFh or Signal not received	1. Take alternative control based on VS_TCU(From TCU2) 2. When both VS and VS_TCU are FFH or not received, processing the Vehicle speed to FAIL(0 Kph alternative control)	

9	N (Engine Speed)	Signal not received	Fixed at 650 RPM	
10	F_N_ENG (Error-engine speed signal)	01h or Signal not received	Fixed at 650 RPM	
11	TPS (Throttle Position Signal)	FFh or Signal not received	Fixed at 0%	
12	TEMP_ENG (Engine Coolant Temperature)	FFh or Signal not received	Fixed at 90°C (Include estimated torque calculation)	
13	R_TqAcnApvC (Max Torque limitation of A/C Compressor)	FFh or Signal not received	Fixed at 0 Nm	
14	R_PAcnC (APT Sensor Output Value)	FFh or Signal not received	Fixed at 0 hPa	
15	R_NEngIdlTgC (Engine Idle Target Speed)	FFh or No Signal not received	Use the Replacement Tabel	
16	SUNROOF ON/OFF (C_SunRoofOpenState)	Signal not received	Process the signal to C_SunRoofOpenState=0H (SUNROOF Interlocking Logic not working)	

- Replacement

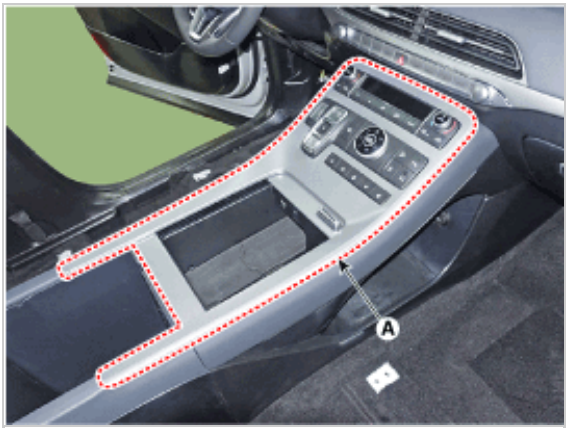
NOTICE

- When removing with a flat-tip screwdriver or remover, wrap protective tape around the tools to prevent damage to components.
- Put on gloves to prevent hand injuries.

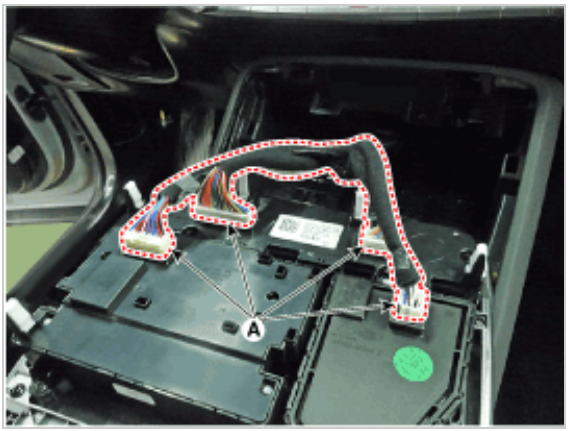
⚠ CAUTION

- Take care not to bend or scratch the trim and panels.

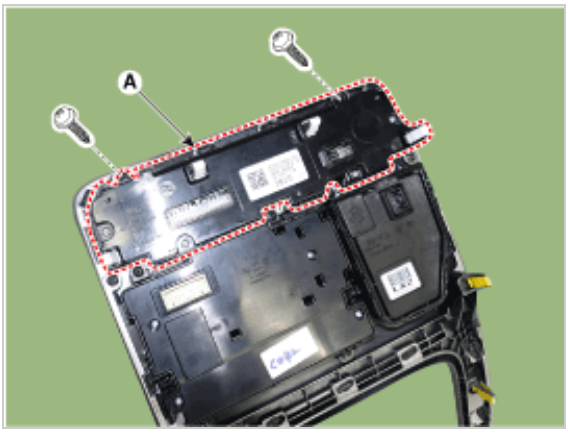
1. Disconnect the negative (-) battery terminal.
2. Using a flat-tip screwdriver or remover and remove the console upper cover (A).



3. Press the lock pin and separate the various connectors (A).



4. Loosen the mounting screws and remove the heater & A/C control unit (A).

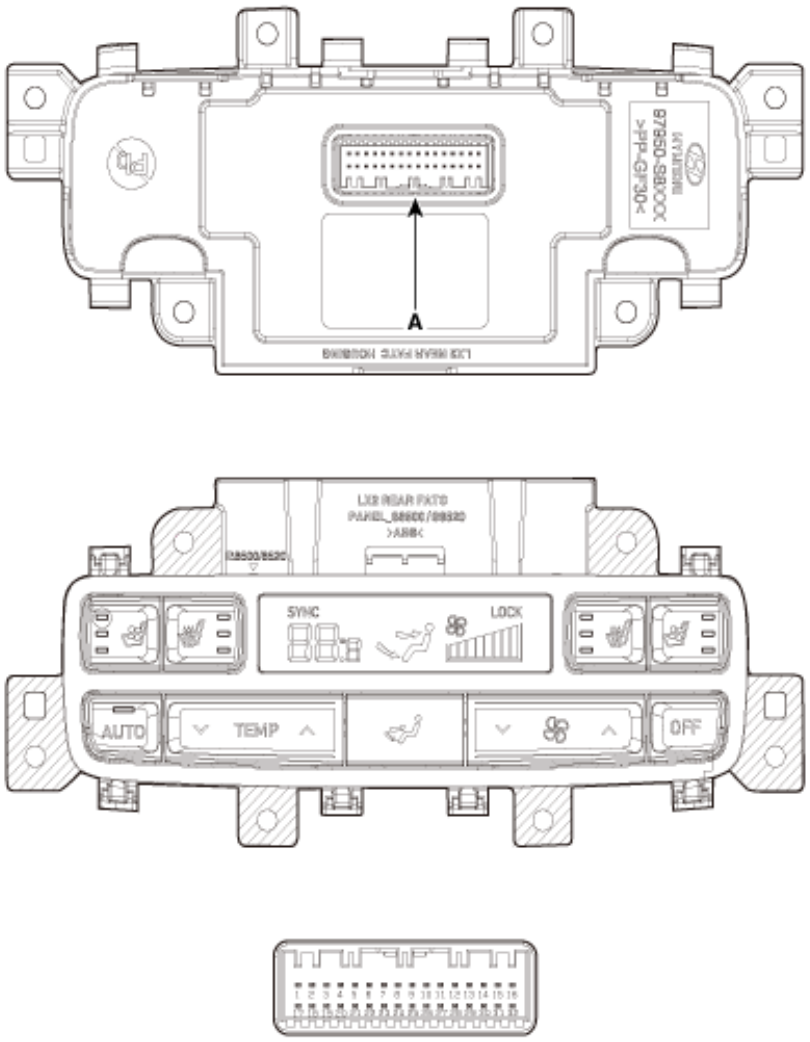


5. To install, reverse removal procedure.

Information

- Replace any damaged clips (or pin-type retainers).
- Make sure the connector are connected in properly.

- Component



[Connector A]

Connector Pin Function

Connector	PIN No	Pin Function	Connector	PIN No	Pin Function
A	1	Battery	A	17	IGN2
	2	ISG B+		18	IGN1
	3	ILL+ (TAIL)		19	Blower Motor (+)
	4	Sensor Ground REF (+5V)		20	-
	5	Mode Control Actuator Feedback		21	Mosfet (DRAIN F/B)
	6	Temperature Actuator Feedback		22	Mosfet (GATE)
	7	Mode Control Actuator (Vent)		23	Heater Switch _ LH
	8	Mode Control Actuator (Defrost)		24	Indicator (HIGH) _ LH
	9	Temperature Control Actuator (Cool)		25	Indicator (MID) _ LH
	10	Temperature Control Actuator (Warm)		26	Indicator (LOW) _ LH
	11	Detent out (-)		27	Heater Switch _ RH
	12	K - Line		28	Indicator (HIGH) _ RH
	13	LIN Left		29	Indicator (MID) _ RH

	14	Lin Right		30	Indicator (LOW) _ RH
	15	-		31	Sensor Ground
	16	ILL - (RHEO)		32	Ground

- Replacement

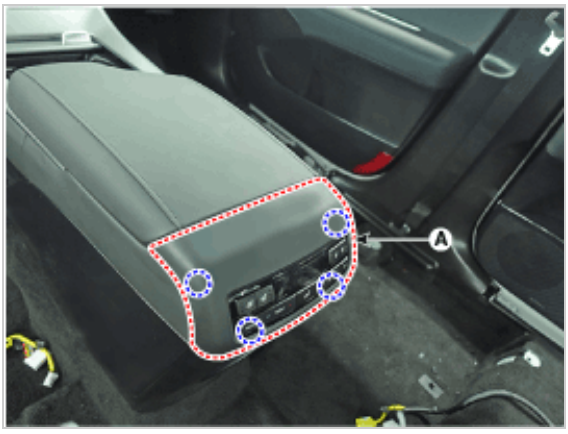
NOTICE

- When removing with a flat-tip screwdriver or remover, wrap protective tape around the tools to prevent damage to components.
- Put on gloves to prevent hand injuries.

⚠ CAUTION

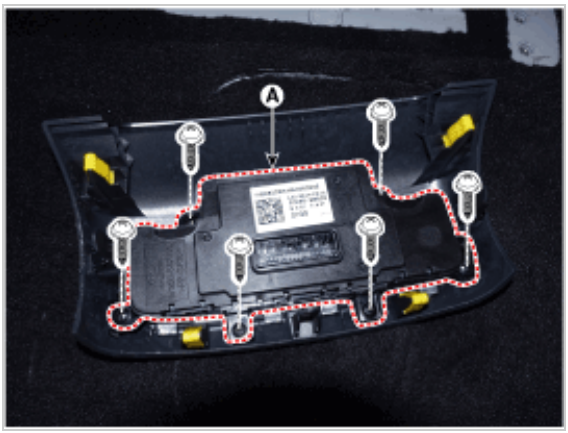
- Take care not to bend or scratch the trim and panels.

1. Disconnect the negative (-) battery terminal.
2. Using a flat-tip screwdriver or remover and remove the rear console upper cover (A).



3. Press the lock pin and separate the rear console connector (A) and remove the rear console upper cover (B).

4. Loosen the mounting screws and remove the rear heater & A/C control unit (A).



5. To install, reverse removal procedure.

Information

- Replace any damaged clips (or pin-type retainers).
- Make sure the connector are connected in properly.